ARCADIAN

November 10, 1981 Volume 4 Number 1

PURPOSE of the ARCADIAN is to act as a user-dominated forum for the dissemination of material having to do with the Bally/AstroVision Arcade cum computer. We include programs, operational hints, tutorials, and hardware items of value. The underlying reason for the paper is to help us all understand how and why the machine operates the way it does. We can then make it operate the way we want it to and expand its usefulness.

HISTORY in a nutshell - The Chicago mail order house of JS&A advertised the Bally system in popular magazines in late 1977, and a number of us bought the unit. There were lots of promises of expansion capability and actual hardware to be available in mid-1978. Delivery was poor, some of the promised material never did show up. The Basic cartridge did appear and I started this paper in November, 1978. I got tired of waiting for the Add-On memory expansion and was about to contract to get one made for us, when the Fidelity Electronics purchase became imminent. We took a second look and opted out, because there was no way we could compete with a factory product. We started to look at smaller projects, and eventually the expansions called 'Blue Ram' and 'Viper' became available. AstroVision finally took over the Bally Consumer Products Div. product, and is now aggressively moving ahead. with new videocades and the AddUnder expansion unit.

TECHNICAL ASPECTS of this paper include the fact that all typing is done on an Apple, using the Super Text word processor system, and the output is printed of a Comprint 912S electrostatic printer. Programs are printed using the Arcade as the driver, using the *PRINT command and a tap from the cassette interface. A minor inconvenience is that the printer does not have a divide sign, a multiply sign, or a right arrow - instead, it prints out a lower case letter, as follows:

a = right arrow → b = multiply * c = divide ÷

CALIFORNIA HERE I COME! is being heard around the halls of AstroVision! Yes, they are moving their offices to a small town near Sacramento, and will have a second production facility there. The move is taking place about the time you will be receiving this. The new address will be 11167 Trade Center Drive, Suite D, Rancho Cordoba, CA 95670.

ASTROVISION BASIC FEATURES: EDITOR

Editing of programs is now considerably easier. The operation is: Type the line number of the line to be corrected. Press PAUSE repeatedly to recall each individual entry in the line, one by one. Use ERASE to back up (and therefore eliminate) an entry, allowing the typing in of additional or replacement entries.

You can continue to PAUSE until the entire line is shown, and one more entry will act as the GO command. As a short cut, if you make a change in the beginning of a long line, instead of using PAUSE repeatedly to get to the end of the line, use WORDS SPACE to enter the entire corrected line.

Utilization: After entering a taped program, I LIST the program and watch for ???. Mark down the line numbers where these appear, and when the whole program has been listed, I go back to correct each line. List the single line using LIST nnn,1 where nnn is the line number (the comma and 1 tell the machine to just list one line). Then I look to see where the ??? tells me the problem is, use the PAUSE control, etc., as described above to make the corrections, and finally re-list the line to see that it is correct.

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This page is written for the new ARCADIAN reader to give him a very short updating to today's status.

WHAT HAVE I BOUGHT???

The Arcade machine that you have contains four built-in programs as described in the literature that came with the machine, and it will accept Videocades in the game slot for other games, as produced by AstroVision/Bally. One of these Videocades is entitled "Basic", and insertion of this cartridge will allow you to access the Z-80 microprocessor located inside the machine, and that is what we are all about. The machine contains three custom circuits, not available in any other TV game, that help the Z-80 perform. These special circuits are enclosed in three integrated circuit chips called DATA, INPUT/OUTPUT, and ADDRESS. Also included is a memory consisting of approximately 4000 bytes of Random Access Memory (RAM), and 8000 bytes of Read Only Memory (ROM). When you insert the Basic cartridge, you can personally enter a program of up to 1800 bytes into the 4000 byte RAM. The Basic is derived from "Palo Alto Tiny Basic" written by Dr. L. Wang a number of years ago. A listing and discussion of this language is contained in Volume One of "Dr. Dobbs' Journal of Computer Calisthenics and Orthodontia" (Still available at some of the bigger computer outlets.) We can supply a listing with remarks of both the Bally Basic and the AstroVision Basic. Both of these Basics were written by Jay Fenton.

As mentioned above, the largest program that can by entered into the Arcade is 1800 bytes. While some clever program entries have been made to utilize this space efficiently, it is woefully small for any serious programming. To alleviate that problem, three avenues of enlargement are available:

ooo 1.The AstroVision Add Under. This item is currently in a pre-production prototype construction phase. That is, all the critical design parameters have been set and some hand-wired units are being built to test the concept. Meanwhile, the printed circuit board is being laid out for the production version. These prototypes will be available for show/operation at the Consumer Electronics Show (CES) early next year (where most new products are shown to wholesalers). By that time the production system should be moving along well enough so that hardware will be available by February or March for deliveries to start. We shall see. The Add Under will have enough memory for any reasonable program, and a new, different, language called ZGRASS. Its projected cost is $600.

ooo 2.The Perkins Engineering "Blue Ram". This memory addition allows you to expand your programs by 4000 bytes. It plugs directly onto the 50-pin connector at the back of the Arcade, and has a separate power supply. In addition to providing raw memory for programming, numerous 'extras' are included or available to enhance its operation. A keyboard can be attached, for example, and a new language cartridge was just announced. 1004 Pleasant Ave., Boyne City, MI, 49712

ooo 3.Alternative Engineering produces the "Viper System", which has a modular approach to memory expansion. A large box contains a power supply and one (Viper 1) or more (Viper 5 or 10) memory cards (each card has about 16000 bytes). The Arcade sits on top of the Viper box and is connected by a short cable using the 50-pin connector at the rear. A keyboard is available as an extra. The Viper package includes a free copy of the Extended Basic language on tape. P.O.Box 128, Gardiner, ME 04345

Author Steve Walters has sent us a variation and explanation of the loading method he suggests for his program that was listed in the last issue, p.126.

The technique used to load the HALLOWEEN GRAPHICS program involves the direct mode (i.e., no line numbers used). A general explanation was printed in the ARCADIAN in Vol.3, No. 2, p. 20-21 (Dec., 1980) with a correction added in Vol.3, No. 3, p. 31 (Jan., 1981).

For the HALLOWEEN GRAPHICS program, the specific tape-loading procedure is as follows, after you have entered the program (ARCADIAN p. 126) in the computer:

1. enter the following in direct mode (no line number):

```
:PRINT; TV=0; TV=1; PRINT; PRINT ".HALLOWEEN GRAPHICS";
PRINT ".BY S. WALTERS 10/80"; PRINT; LIST; PRINT;
PRINT ".STANDBY FOR"; PRINT ":RETURN; :INPUT 2"
```

   Do not press GO yet. Turn your tape recorder on "record" to record the program, then press GO.

   You will see ?? for the input code, then the title, then the program list. When you see the last item (:RETURN; :INPUT 2) appear on the screen, immediately turn off the tape recorder, but do no rewind the tape.

2. We will now add the data trailer to the tape. Clear the computer memory, then enter LINES 10 thru 40 on ARCADIAN page 127.

   Then in direct mode enter :PRINT; RUN but do not press GO yet. Turn your tape recorder on "record" to record the data, then press GO.

   Again you will see ?? for the input code, then the data print on the screen, and then the last item (:RETURN; RUN). Turn the tape recorder off, rewind, and clear the computer memory.

3. The tape is now ready to load and will run automatically when input is completed. Load the tape into the computer using :INPUT 1 since the TV input code "1" was used.

   The actual input operation involves the following for the computer:

   :INPUT 1 opens the input port, and the computer then responds to the input code 1 by inputing the title (which is ignored by the computer since the period preceeds the characters) and the program. the :RETURN instruction then closes the input port, and the :INPUT 2 reopens the port for an input code 2. This eliminates the junk which results if the tape is simply stopped and restarted for the two taping steps.

   The input code 2 causes the computer to input the data, :RETURN then closes the input port and RUN causes the program to start automatically at the end of the loading.

Ad:

*** BLUE RAM SUPER EXTENDED BASIC *** FOR USE WITH THE BLUE RAM AND ITS ACCESSORIES. THIS LANGUAGE COMES IN A NORMAL CARTRIDGE AND HAS ALL OF THE FEATURES OF THE STANDARD BALLY BASIC -PLUS- ALL OF THESE ADDITIONAL FEATURES BY JAY FENTON AND (*)PERKINS ENGINEERING:

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This program is Nuclear Math, discussed on page 8.

```
  1 L=1;Q=0;S=-1;T=B0;&(9)=43;BC=24B;FC=92;NT=0;GOTO 80
  2 E=RND (10)-1;F=RND (10)-1:RETURN
  3 E=RND (90)+9;F=RND (90)+9:RETURN
  4 E=RND (900)+99;F=RND (900)+99:RETURN
  5 E=RND (6384)+9999;F=RND (6384)+9999:RETURN
  6 E=RND (22768)+9999;F=RND (22768)+9999:RETURN
  7 E=RND (181);F=RND (181):RETURN
  8 E=RND (3);F=RND (3);RETURN
  9 F=RND (20)b5;E=FbRND (10):RETURN
 10 F=RND (9);E=FbRND (10):RETURN
 11 F=RND (9);E=FbRND (100):RETURN
 12 F=RND (999);E=RND (32)bF:RETURN
 13 CX=27;CY=-16:RETURN
 15 GOSUB 13;PRINT "S0RRY!";FOR A=1TO 250:NEXT A;T=T+5;GOSUB 13;PRINT "      ";
RETURN
 16 G0SUB M;BOX 29,-14,80,40,2;RETURN
 20 L=Sc5+1;IF L<1L=1
 22 IF Qc5 X=RM;IF Q#5IF Qc(Q-5)IF X>RM-1L=L-1
 25 IF L<1L=1
 26 IF L>4L=4
 27 RETURN
 28 CX=34;CY=0;NT=0;PRINT #1,E;CX=20;CY=-8;TU=K;CX=34;CY=-8;PRINT #1,F;BOX 40,-
13,50,1,1;CX=22;CY=-20:INPUT "?";G;Q=Q+1:RETURN
 29 CX=27;PRINT "C0RRECT!";T=T-2;S=5+1;RETURN
 30 BOX -52,-3,1,59,2;FOR Z=40TO T;NT=2;MU=2;BOX -52,2-72,1,1,1;NEXT 2;RETURN
 32 GOSUB P;IF G=EbFGOSUB R;RETURN
 33 RETURN
 34 IF (T<41)+(T>99)GOTO Y
 35 RETURN
 40 FOR A=-31TO 21STEP 10;CY=A;PRINT #0,B;B=B+10:NEXT A;RETURN
 80 CLEAR ;CY=0;PRINT "INPUT + - b c?";K=KP;N=Kb10
 90 NT=0;CLEAR ;BOX -45,0,44,79,1;BOX -45,0,42,77,3;BOX -45,0,40,75,1;BOX -45,0
,36,71,3;BOX -52,29,7,6,1;BOX -52,29,5,4,3
100 BOX -52,-3,3,58,1:BOX -52,-3,1,59,3:FOR A=-31TO 26STEP 2:BOX -50,A,1,1,1:NE
XT A;FOR A=-31TO 21STEP 10:BOX -49,A,1,1,1:CX=-43
110 CY=A;PRINT #1,A+71:NEXT A;&(0)=0;&(1)=0;&(2)=7;&(3)=7;&(9)=16;GOTO N
430 GOSUB C:GOSUB L+1:GOSUB P;IF G=E+FGOSUB R
432 GOSUB 16;IF G#E+FGOSUB 15
434 GOSUB O;GOTO N
450 GOSUB C
452 IF L<4GOSUB L+1;IF E>FGOSUB P;GOTO U
455 IF L=4GOSUB G;IF E>FGOSUB P;GOTO U
460 GOTO 452
470 IF G=E-FGOSUB R
480 GOSUB 16;IF G#E-FGOSUB 15
490 GOSUB O:GOTO N
980 GOSUB C
982 IF (L=2)+(L=3)GOSUB L;GOSUB W
984 IF L=1GOSUB B;GOSUB W
986 IF L=4GOSUB 7;GOSUB W
987 GOSUB 16;IF G#EbFGOSUB 15
989 GOSUB O;GOTO N
990 GOSUB C
992 GOSUB L+B;GOSUB P;IF G=EcFGOSUB R
994 GOSUB 16;IF G#EcFGOSUB 15
995 GOSUB O;GOTO N
1000 &(10)=0;CLEAR ;B=35;FOR A=B0TO 50STEP -3;B=B-4;BOX -35,B+B,A,4,1;BOX -35,-B
-B,A,4,1;BOX 35,B-B,A,4,1;BOX 35,-B-B,A,4,1:NEXT A
1010 &(9)=43;FOR A=0TO 180;&(10)=A:NEXT A;IF T>99GOTO 1050
1030 GOTO 1100
1050 B=0;&(16)=RND (5)+250;&(17)=RND (5)+250;&(18)=RND (5)+130;&(19)=RND (5)+58;
&(21)=255;&(22)=255
1060 &(23)>255:FOR A=1TO 80;MU=A;BC=Ab3;B=B+2;BOX 0,0,B,B,3;NEXT A:FOR A=16TO 23
:&(A)=0:NEXT A;GOTO 1110
1100 CX=-36;CY=0;PRINT " PLANT SAVED!";FOR A=1TO 30;FOR D=1TO 150;NEXT D;BC=RND
(32)bB;FC=BC+44RND (32)bB;NEXT A
1105 CY=-8;PRINT " YOU G0T ",#1,S-1," 0UT 0F ",Q,"!!!
1108 FOR A=1TO 500;NEXT A
1110 PRINT " TO PLAY AGAIN PRESS A KEY";IF KPRUN
```

see p.1 explanation

Michigan User Group meeting on Nov 22, in Northville. Call Don Gladden (address below) or 313-437-3984 for details.

Don Gladden
59400 Nine Mile Road
South Lyon, MI 48178

New User Group in Peoria
Gerry Thatcher 309-383-4238
Bob Walker 309-745-8225

4D2 is an interesting graphics program that has a number of subtleties, made up by Rusty Blommaert and Dale Smith.

George Moses added lines 3000 and 3010 as a tool for getting the string variables loaded onto tape once you have entered them into the computer, as follows:

Enter the entire program, down through line 3010, then RUN it. The program will first review the contents of @(1) /because of line 2400/, and since the contents are now 0, it will start the process of asking you to enter the string variables, 0 through 87. Enter these from the list on the right. When through, RUN the program again. This time, when the program looks at @(1), it will see the desired 8693, and will jump to line 2450 and continue. Now, to load the program on tape, and save all those strings you just finished loading, HALT the program while it is running, start your tape recorder on RECORD, and enter GOTO 3000. You will see some strange activity as the entire program is loaded at the top of the screen only - have no fear, its ok.

```
10 GOTO 2400
20 XY=0;LINE X,Y,3
30 IF Y XY=0;LINE X,-Y,3
40 IF XIF Y XY=0;LINE -X,-Y,3
50 IF X XY=0;LINE -X,Y,3
60 RETURN
70 CALL20078
80 CALL20078
90 IF TR(1)=0RETURN
100 &(9)=44
110 :RETURN
120 CLEAR
130 CALL1532
140 &(10)=176
150 NT=1
170 GOSUB 2000
180 STOP
200 FOR X=3TO 79STEP 2
210 BOX 0,0,X,X,3
220 NEXT X
230 GOTO 70
300 FOR Y=79TO 3STEP -2
310 BOX 0,0,Y+Y-1,Y,3
320 NEXT Y
330 GOTO 70
500 FOR Y=0TO 40STEP 10
510 FOR X=5TO 75STEP 10
520 GOSUB 20
530 NEXT X
540 NEXT Y
550 GOTO 70
700 FOR Y=0TO 39
710 X=78-2bY
720 GOSUB 20
730 NEXT Y
740 GOTO 70
900 RETURN
1100 FOR X=0TO 79
1110 Y=39-Xc2
1120 GOSUB 20
1130 NEXT X
1140 GOTO 70
1300 X=79
1310 FOR Y=0TO 42
1320 GOSUB 20
1330 NEXT Y
1340 GOTO 70
1500 RETURN
1700 Y=42
1710 FOR X=0TO 79
1720 GOSUB 20
1730 NEXT X
1740 GOTO 70
2000 F=21024;G=19494;H=00;RETURN
2010 F=20303;G=21328;H=33;RETURN
2020 F=13313;G=12868;H=00;RETURN
2030 F=16706;G=19532;H=89;RETURN
2040 F=21313;G=21076;H=79;RETURN
2050 F=16706;G=18771;H=67;RETURN
2060 F=17952;G=20053;H=32;RETURN
2070 F=16711;G=17741;H=83;RETURN
2080 F=21837;G=18771;H=67;RETURN
2090 F=22305;G=22351;H=33;RETURN
2100 F=17736;G=19532;H=79;RETURN
2110 F=16828;G=17753;H=32;RETURN
2200 FOR Z=1TO 32767
2210 W=2c9
2220 GOSUB 2030+RMb10
2230 W=2cZ
2240 IF RM=0GOSUB 200
2250 FOR V=3TO 17STEP 2
2260 W=2cV
2270 IF RM=0GOSUB Vb100
2280 NEXT U
2290 NEXT Z
2300 GOTO 2200
2399 .SET-UP SECTION:
2400 IF @(1)=8693GOTO 2450
2410 FOR R=0TO 87
2420 PRINT R,
2430 INPUT "*@(R)
2440 NEXT R
2450 :RETURN
2460 CLEAR
2470 :INPUT
2480 CALL1532
2490 &(9)=44
2500 &(10)=172
2510 A=-43;B=1845;C=-22499
2520 D=20088;E=-13871
2530 GOSUB 2020
2540 CALL20078
2550 FOR R=0TO 87
2560 %(2bR+19824)=@(R)
2570 FC=RbB-696
2580 NEXT R
2590 J=8438;K=19824
2600 L=16115;M=-4786
2610 N=15943;O=-11390
2620 P=-12671;Q=201
2630 CALL20078
2640 CALL20100
2650 &(9)=20
2660 GOTO 2200
```

Rusty Blommaert
2901 Willens Dr. #6
Melrose Park, IL 60164

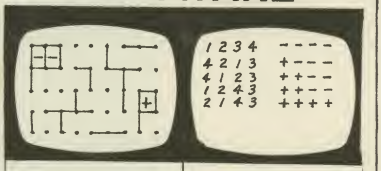
```
3000 A=-24576;B=%(20050)+176;NT=1;:PRINT ;CLEAR ;PRINT @1,"A=-24576;B=",B,";FOR
N=ATO B;%(N)=KP;NEXT N;%(20050)=B-176;:RETURN ;RUN "
3010 FOR N=ATO B;CY=40;TV=%(N);NEXT N;:RETURN
```

```
0= -6715    45=  -767
1=  8693    46= 11263
2= 19998    47=  2423
3= -4090    48= 16582
4=  7387    49= 11127
5=-25429    50=  2423
6=  3855    51=-32570
7=  3855    52= 11127
8= 20284    53=  2423
9=-28290    54=-16186
10= 11127   55= 11127
11= 12517   56=  2423
12= -2807   57=  6145
13=-14722   58= -4856
14= 30472   59= -7749
15=    58   60=  7994
16= -3762   61=-14770
17=-24473   62= 12408
18=  1824   63= 15878
19=-25542   64=   332
20= 12878   65=    -8
21= 19975   66= 12809
22=  4015   67= 19999
23=  3855   68=  4051
24= 28431   69=  2817
25=-14724   70= -4856
26=-24491   71= -3653
27=  1824   72=-15903
28=-25030   73=-13829
29= 12878   74= 30451
30=  19976  75=    64
31= -19025  76=     0
32=   3122  77=     1
33=  31822  78=     0
34=  21974  79=     0
35=   8352  80=     0
36=  14855  81=     0
37=  20122  82=     0
38=   2354  83=     0
39= -20658  84=     0
40=   3855  85=     0
41=   3855  86= -256
42=   2866  87=19456
43= -7058
44= 32485
```

```
 1 .
 3 .CODER-DECODER
 5 .ED GROEBE
 6 CLEAR
 7 BC=8;FC=7
 9 PRINT "AT END OF MESSAGE KEY IN $";PRINT ;PRINT
10 PRINT "KEY 1(CODE) OR 2(DECODE)
15 PRINT
20 M=KP;IF (M>50)GOTO 20
30 TV=M;IF M=50M=-1
35 PRINT ;IF M=49M=1;GOSUB 550
38 PRINT
40 PRINT "ENTER  MESSAGE
45 PRINT
50 FOR Z=1TO 284
60 IF Z<1Z=1
70 @(Z)=KP
80 IF @(Z)=36GOTO 200
90 IF @(Z)=31GOTO 400
100 TV=@(Z)
110 NEXT Z
200 PRINT ;E=Z-1
210 FOR Z=1TO E
220 IF M=-1GOSUB 490
230 IF @(Z)<78S=1
240 IF @(Z)<58S=0
250 IF @(Z)>77S=-1
260 @(Z)=@(Z)+(Sb13)
270 IF M=1GOSUB 490
280 TV=@(Z)
290 NEXT Z
295 IF M=-1GOTO 600
298 PRINT ;PRINT
300 PRINT "WANT IT DECODED? KEY  2
310 M=KP;IF M=50M=-1;GOTO 200
320 GOTO 310
400 IF CX=-77CY=CY+8;Z=Z-26;BOX 0,CY,160,8,2;GOTO 60
410 CX=CX-6;BOX CX,CY,6,8,2;Z=Z-1;GOTO 60
490 IF @(Z)<58RETURN
500 N=(Z-(Zc10)b10)
510 IF N>7N=7
520 @(Z)=@(Z)-NbM
530 RETURN
550 PRINT "USE LETTERS & NUMBERS ONLY";RETURN
600 IF KPRUN
```

Ed Groebe
12046 Flambeau Drive
Palos Heights, IL 60463

EDGE
SOFTWARE



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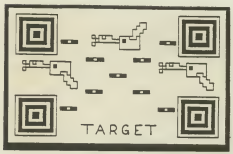
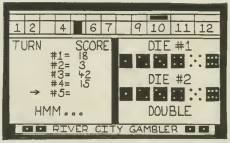
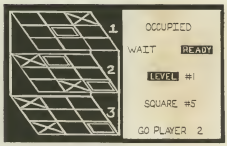


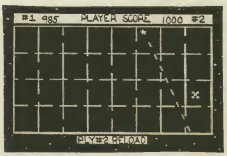
Target
1 to 4 players



River City Gambler
1 to 5 players **

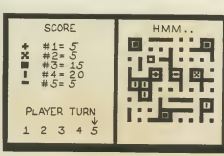


3-D Tic Tac Toe
2 players



Phantom Star Fighters 2003
2 players

Space Checkers
2 players



Claim Jumper
1 to 5 players **

CONTEST ENTRIES this month are three:

o 4D2, which is a purely graphics presentation that gives you something soothing to look at and admire. While the program appears random, I am told that it is a giant loop that starts again in about three days. There is a lot of machine language code in it, and it runs in Bally Basic only. The authors are working on an AstroVision Basic version.

o Nuclear Math is an arithmetic training game that asks the operator to perform math problems. Correct answers will cool the nuclear reactor thermometer, while incorrect ones will drive the temperature up to a calamity.

o Code-Decode is a 'utility' program that is used for a specific purpose. The program will automatically encrypt a message using some special rules. Only another Arcade with the same program will be able to decrypt the message. Note that this is not a substitution type of code, but real encryption, where a single letter does not always have the same meaning.

BLUE RAM EXTENDED BASIC cartridges are now being delivered. See their ad for details of the cartridge. Attach the Blue Ram memory addition, and then insert the Blue Ram cartridge. The screen goes blue and the title (as printed above) comes up. Then the cursor shows up in the small font format, as does anything entered. By using CF=LARGE, the font size changes to the standard. If you have the Ble Ram Keyboard, it can be attached, and all entries made through it. The ROM cartridge contains the keyboard operating system, eliminating the old tape entry method.. The keypad works as well. We'll be including some tutorials and programs for the Ram's new Basic cartridge very soon.

Advertisements - The two or three-line items on the last page are free to subscribers until they get overwhelming. Small display ads up to 1/4 page are also free. Send for rates on half-page or larger ads.

Programs in the ARCADIAN are entirely the work of subscribers. Programs should be sent on a tape (if you have the Bally Basic, I prefer it that way), accompanied by a listing (which may be hand written, as long as it is legible - we only use it in case the tape fails), and a complete description as to operation, etc., of the program. Submittal of a program is considered to be a donation for the common betterment and education of all, and no payment is made. We do, however, have a monthly contest. Any program submitted to the contest requires a statement that the program is an original work and not a copy of an existing program. Contestants will vie for a $100 prize, supplied by the ARCADIAN. We have a 5-man rotating judging panel who use their own criteria to decide between contestants. There must be at least two entrants for the contest to operate. At the end of the Volume year, we go back and select 10 of the most popular programs from the entire stock (except contest winners), and make up a tape to be sold by dealers and directly. Sales of these "Best of ARCADIAN, 198x" programs will result in royalty payments to the authors.

PLEASANT DILEMMA is caused by having both the Blue Ram and Viper extended memory systems here, and having to pick and choose which one to plug into the Arcade. Well, there are two Arcades here now, each with an extended memory and so we will be able to try out both systems in parallel, entering programs into both to check operation and compatibility.

The Bit Fiddlers will be presenting a cartridge that will allow machine code programming directly from the keyboard later this month. I expect a full ad in the next issue.

When you're through playing "Space Invaders" . . .

PLAY "SILENT NIGHT" on your Bally Arcade!

PRESENTING 3-PART ARCADE CHRISTMAS MUSIC

A 60 minute cassette tape that programs your Arcade to play 27 beautiful Christmas Carols in 3-part harmony, some with vibrato. Close your eyes and listen and you'll think someone's playing an organ!

Just push: INPUT-GO and they all play consecutively.
All 27 programs on one tape $9.50

Send check or money order to:

GEORGE MOSES CO.
110 E. North St., Brighton, MI 48116
(313) 227-1575

NEW 3 VOICE MUSIC ASSEMBLER FEATURING NO REM STATEMENTS!

BY GEORGE MOSES

In May, 1980 The Arcadian published an introduction of three-voice music programming to Bally Basic afficianados. I received this program, previously thought impossible in Basic, from its creator, Brett Bilbrey of Dearborn, Michigan and spent about 3 months refining it to make it more easily used and understood by Arcadian Subscribers.

This program opened the door to a new realm of creative expression with my Arcade and I spent hundreds of hours programming sheet music. Along the way, I made changes in the program to clean up the timing problems inherent in the many counting loops and IF statements of the original program. That whole program has now faded into obsolescence as new discoveries have initiated a complete overhaul of the music assembly methods used in the past. Somewhere you have to quit changing a program and say, finally, "This is the way it's gonna be!" That's the program we've included here.

Shortly before completing it, I received a letter from Jim Dunson in Pensacola, Florida that led to the biggest and final revision, the elimination of REM (.) statements for storing the poked data. Jim discovered that you can poke data into the text memory area beyond %(20050), which is the memory address of the SZ indicator at the end of your program. If you command the computer to PRINT %(20050) GO it will print out the memory address of the end of the program. The advantage of this method is that you no longer have to type in those long REM statements at the beginning of the program to store your data. However, you need to use a new method to write the data to tape as your computer won't list the data beyond %(20050). So, I've included a print-to-tape subroutine beginning on line 15 and created for this purpose by Dave Ibach of Northville, Michigan.

THE MUSIC PROGRAM

BY GEORGE MOSES

With the help of Brett Bilbrey, Jim Dunson & Dave Ibach

```
 1  :RETURN ;NT=0;K=127;L=255;M=256;GOTO 3
 2  FOR C=A-1TO E-2STEP 3;&(17)=%(C)÷M
      +K;&(18)=%(C+1)÷M+K;&(19)=%(C+2)÷M
      +K;FOR D=1TO T;NEXT D;NEXT C;RETURN
 3  NT=0;IF B=0B=%(20050)+6;%(B-1)=1;E=B
 4  FOR N=0TO 2;PRINT #1,E,;INPUT ""J;IF J►M
    INPUT "START AT?"A;GOTO 6
 5  J=J-K;J=J+L×(J◄0);@(N)=J;NEXT N;NT=1;
    INPUT "DURATION"D;FOR N=1TO D;FOR A=
    0TO 2;%(E+A)=%(E+A)÷M×M+@(A);NEXT A;
    E=E+3;NEXT N;RUN
 6  CLEAR ;BC=RND (32)×8+2;FC=BC+4;NT=0;
    K=127;M=256
 7  T=15;&(16)=49;&(21)=12;&(22)=204
 8  GOSUB 2
 9  FOR F=22TO 16STEP -1;&(F)=0;NEXT F;CY=0;
    PRINT "[1]REPLAY";PRINT "[2]INPUT ";PRINT "[3]
    CHANGE";PRINT "[4]PRINT TO TAPE
10  R=KP;IF R=49GOTO 6
11  IF R=50RUN
12  IF R=51INPUT "ADDRESS OF CHORD?"E;RUN
13  IF R=52GOTO 15
14  GOTO 10
15  H=-24576;NT=1;:PRINT ;CLEAR ;PRINT "H
    =",#1,H,";E=",E,";B=",B,";A=B;
    FOR N=H TO E;%(N)=KP;NEXT N;%(20050)=
    B-6;:RETURN ;GOTO 6
16  FOR N=H TO E;CY=40;TV=%(N);NEXT N;
    :RETURN
```

SAMPLE DURATION CHART

(If song's shortest note is 16th note)

NOTE	INPUT
16th	*1*
8th	*2*
Quarter	*4*
Half	*8*
Whole	*16*

FIG. 1

Song's shortest note is the reference point receiving a duration of 1. Then, each advance in note category doubles in duration value.

After you've input the program, record it on tape for safekeeping. Then press RUN and GO. The screen will clear and you'll see the beginning address of the first chord at the top of the screen. Using the notes from your sheet music converted to the numbers on the note chart (FIG 2), input the 3 notes in your first chord. Then the computer will ask for the duration of the chord. (See FIG. 1). The duration of a chord is determined by the shortest note in the chord. If all three notes are of identical length there's no problem. Any notes of longer duration than the shortest sounding note should be carried into the next chord and even into the chords following, if necessary, until their total duration has been accounted for. When carrying a note through two or more chords input it into the same voice and it will continue to play as one continuous, but longer sounding note. To play the same note in successive stacatto beats just input it into a different voice for each chord. (See FIGS. 3 & 4.)

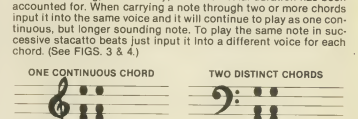


FIG. 3 FIG. 4

To illustrate FIG. 3, press WORDS RUN GO to get the program running. Input the first chord thusly:

```
26 GO
39 GO
50 GO
 4 GO
```

Allow an interval of time after the Duration entry for the computer to perform the pokes to memory. Then go to the next chord and repeat the process. To hear the two chords type:

```
333 GO
  B GO
```

and the computer will ask "START AT?" Type:

Listen! It's just one long, continuous chord. Now input FIG. 4. Select CHANGE from the menu. Then the computer will ask: "ADDRESS OF CHORD?" Type "B" to get back to the beginning of data storage and input FIG. 4 just as you did FIG. 3. Listen to the two chords in FIG. 4. You heard two distinct chords, didn't you? That's what happens when you switch the notes to different voices in succeeding chords. If you have less than 3 notes in a chord, or no notes at all, as in a rest, just input a zero into any voice not being used.

After you input a duration the computer will poke the entire chord into memory as many times as the duration number you selected. Then the screen will print the beginning address of the next chord. Anytime you wish to hear the music played up to the last chord you've input, just put in any number greater than 256. I like to use 333. (Don't do this when the computer is asking for a duration or that chord will be poked into memory 333 times, using 999 bytes of memory faster than you can say "OOOPS").

Next you'll be asked for the "START" address of the music. If you want to hear the song from the beginning simply input B, which stores the memory address of the first chord. To begin listening in the middle of the song, input the memory address of the chord you want to start at. To hear it again, press the number 1. To resume inputting data where you left off press 2. To change a chord that doesn't sound right press 3. If you press 3 you'll be ask-

ed for a starting location for changing notes. The same rule applies as for hearing music. Input B for starting at the beginning, or use the chord address to start at a specific chord in the middle of the song.

To keep track of where chords are in memory I mark the chord address at the end of each measure on the sheet music. Then I can easily return to the beginning of any measure to hear or change my music. If at any time you input a wrong note and are immediately aware of it, if you haven't put in the duration for that chord yet HALT the computer and press RUN GO. You'll be inputting at the beginning of the same chord you were just working on because the computer doesn't execute a poke to memory until you input the duration. If you have already input the duratin, you can get back to the chord you want to correct by pressing HALT. Then set the variable E equal to the address of the chord you want to correct. RUN the program and you'll be back at that chord. Type in the correct numbers and work forward from there. The timing on this program is very accurate because a chord is poked into memory in sequence as many times as the number of its duration. When the song is played the computer peeks into the locations in the same way, reading the musical data at a constant speed.

The data is read and played by line 2 which is a subroutine of line 8. The starting location of each block of music is stored in the variable A and the end is stored in E. The significance of this is that you can play the entire song with the statement

```
8 GOSUB 2.
```

To play the song twice as in a repeat bar just use the statement

```
8 GOSUB 2;GOSUB 2
```

which calls the subroutine twice. If you want to repeat only a portion of the music you would preface your second GOSUB with A = – nnnnn:E = – nnnnn; where A is the beginning memory address of the block and E is the ending address so the computer will know where to start and stop reading the data.

CAUTION: With this program the data is stored in memory addresses just beyond the end of the program, so you can't add any bytes to its length once you start inputting or you'll destroy the beginning of your data. You can remove bytes with no effect at all. In fact, once you're done inputting a song you can eliminate lines 4, 5, 11 and 12. But remember that this will make the [2]INPUT and the [3]CHANGE menu selections inoperative.

The speed of the music is controlled by the variable T in line 7. The lower the value of T, the faster the music will play. Line 8 is a good place to print the title of your song on the screen. Just be sure you've removed enough bytes of program to make room for the additional text you're using for the title. Then, use a PRINT command to add your title, followed by GOSUB 2. Example:

```
8 CY = 0:PRINT "CHOPSTICKS":GOSUB 2
```

To save your program on tape simply get your tape recorder running and then press the number 4 when the menu is on the screen that says **[4]PRINT TO TAPE**. The entire program will be saved automatically, including the variables that tell the computer where to start and stop playing the music.

NOTE		VALUE	SHARP	FLAT
E		12	NA	13
D		14	13	15
C		16	15	17
B		17	16	18
A		19	18	20
G		22	20	23
F		24	23	26
E		26	24	28
D		29	28	31
C		33	31	35
B		35	33	37
A		39	37	42
G		44	42	47
F		50	47	53
E		53	50	57
D		60	57	63
MIDDLE C		67	63	71
B		71	67	75
A		80	75	85
G		90	85	95
F		101	95	107
E		107	101	114
D		120	114	128
C		136	128	142
B		142	136	152
A		160	152	171
G		180	171	192
F		205	192	216
E		216	205	230
D		241	230	254
C		NA	254	NA

FIG. 2

THE MUSIC FROM THE BALLY DEMO CARTRIDGE

Run the program and input the following data in columns of four. For example, the first chord is input like this:

```
24 GO
 0 GO
 0 GO
 1 GO
```

Then move one column to the right and continue. When you want to hear the music up to the last chord you've input, type 333 GO. Then input B when asked for the starting address. This is the Bach Allemande you may have heard on the Bally DEMO cartridge your dealer uses to display the Arcade at point of purchase. If you'd like to hear the complete 865 bytes of this song you can find the sheet music for this piece in Schirmer's Library of Musical Classics, Vol. 20, Bach Partitas For the Piano, Book 1, priced at $3.50 at your local music store. This allemande is on page 6. In this case every chord has a duration of 1.

```
24 152 152 152 152 37 29 50 37 60 50 75 80 50 42 29 24 22 28 37 39 37 28 44 37 57 44 75 57 44 37 28 22 19 28 33 37 33 28 39 33 57 39 67 57
 0  24  29  37  39  0  0  0  0  0  0  0  0  0  0  0  0  0 152 152 152 152  0  0  0  0  0  0  0  0  0 152 152 152 152  0  0  0  0  0  0  0  0  0
 0   0   0   0   0  0  0  0  0  0  0  0  0  0  0  0  0  0   0   0   0   0  0  0  0  0  0  0  0  0  0   0   0   0   0  0  0  0  0  0  0  0  0
 1   1   1   1   1  1  1  1  1  1  1  1  1  1  1  1  1  1   1   1   1   1  1  1  1  1  1  1  1  1  1   1   1   1   1  1  1  1  1  1  1  1  1

39 33 28 19 18 24 29 33 29 24 37 29 50 37 80 50 75 44 80 50 152 152 152 152 53 44 87 53 95 95 95 95 80 87 33 80 57 44 33 35 33 28 39 33 47
 0  0  0  0 152 152 152 152  0  0  0  0  0  0  0  0  0  0  0  0  0  0  33 53 80  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 0  0  0  0   0   0   0   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  90 90 90  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 1  1  1  1   1   1   1   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1

39 33 28 29 33 19 33 180 180 37 39 37 29 28 24 22 33 37 39 37 22 37 24 37 24 28 29 28 22 19 18 18 24 28 29 26 18 28 18 26 18 19 22 24 19
 0  0  0  0  0  0  0  0  0  33 90 90 90 90 101 101 107 107 53 53 53 53 80 80 67 87 136 136 138 138 152 152 160 180 80 80 80 80 90 90 101 101 50 50 39 39
 0  0  0  0  0  0  0  0  0   0  0  0  0  0   0   0   0   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 1  1  1  1  1  1  1  1  1   1  1  1  1  1   1   1   1   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1

26 19 29 19 29 33 37 29 39 29
33 33 37 37 75 75 75 80 80 50 50
 0  0  0  0  0  0  0  0  0  0  0
 1  1  1  1  1  1  1  1  1  1  1
```

If you feel diffident about buying the sheet music then send a blank tape and $2.00 to me at P.O. Box 686, Brighton, MI 48116. I'll put the complete allemande on your tape plus a companion piece that's just as beautiful, and rush it back to you first class.

INTRODUCTORY OFFER: New ARCADE PLUS(with ASTROVISION BASIC) $250. Astrovision BASIC cartridge only $45. Other cartridges 10% off. Z-GRASS-32 ADD UNDER Unit (when available) 25% off. ** Offer good only on orders received before December 31,1981. ** CALL or WRITE: Robert Taylor, 1555 Venus St.,Merritt Is.,Fla. 32952 305-453-2631 VISA or MASTERCARD accepted.

BALLY PROFESSIONAL ARCADE, NEW, with 6 controllers, Basic w/cassette interface, 12 game carts., many audio games. Lists for $820, will sell for $450. (408) 997-3063 (Cal)

Bally with Basic and cassette interface (A-1 shape) 5 factory cartridges, 7 cassettes of skill and adventure, several from Arcadian. Practically complete 3 years of Arcadian. $350. K.Doughty 2344 S R 261 Newburgh, IN 47630

Bally Arcade with 6 controllers, basic, audio interface, works fine $200 plus most videocades at additional cost. L.Burchett, (313) 973 -1096 (Mich)

Bally Arcade, 2 hand controllers, cassette interface, Blue Ram, Basic,programmer sampler cart., maze/tic-tac-toe cart., XY Tutorial cart.,football. Supporting software, Hacker's Guide Arcadian (since 1979) and Cursor (since Jan 80) Best Offer. Al Zarker, 11814 Indianhead Dr., Austin TX 78753

Bally Arcade 2 controllers, Basic, cassette interface, Football, Baseball,Bally Pin, Space Invader, Elem. Math, Vol 1-3 Arcadian, hacker's guide, Service Manual PA-1. Runs great $350 or best offer Glen Walker (916) 363-5967 (Cal)

I have a 12 year old friend that is crazy over my Bally Arcade. I am looking for an Arcade with problems; I have the ability to fix. Send information to Larry W. Horrall, RR#1 Box 62, Wheatland, IN, 47597

Bally Arcade with 4 controllers, Basic, Cassette Interface and 3 game carts.Near new condition.Will include 1 year's subscription or extension in the Arcadian. $250/ofr. Pete (415) 591-9479

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San Jose, CA 95127-9990

*The SOURCE TCD959

EXTENDED MEMORY SYSTEMS I've had the opportunity to use the two extended memory systems - The Blue Ram and The Viper 1 - this past month, though not as much as I would have liked. Actually, the efforts has gone into using the Extended Basic Language we now have in each format, so I have been playing with circles, and snapshots... Recall that the Blue Ram version is on a cartridge, so that none of the Blue Ram available memory space is taken up with the language. Programs can be entered directly when the machine is turned on. The cartridge version allows inputs at either 300 or 2000 baud rate (use :INPUT and the attached tape recorder jack for the 2000 baud program, or :INPUT300 and the old cassette interface for a 300 baud program.) Of course, outputs are done in a similar fashion. Also available is the *PRINT function, which allows printer operation.

In the other version, the Viper arrived with a couple of taped programs, and I entered these into the Blue Ram to see how they would work, and also to get the printing done. With regard to the Viper, its Extended Basic arrives on a tape to be loaded prior to utilization. This loading takes about 8 minutes. At completion of your first successful loading, Alternative Engineering recommends that you make some duplicate tapes using your own recorder, which is an excellent idea. The three other programs were:

1) A checksum program that is used to prove that you have a proper loading of the program, by calculating the sum of all the bytes in each 128-byte block. Each sum is about 15000. They provide a set of answers for each of the 63 blocks checked.
2) A graphics display program that acts as a sort of dictionary of the available commands, with illustrations of many of them.
3) A short display program that superimposes circles and boxes, in four colors, in a sort of kaleidoscope effect.

I must admit to a certain amount of laziness, as I plugged the Blue Ram Extended Basic Cartidge into the Viper to have instant turn-on, and avoid the long wait of loading the tape. And contrari-wise, I loaded the Viper's tapes into the Blue Ram system to avoid having to key in the data.

Both systems have their positive and negative features in detail, but in overall operation, etc., they are quite parallel, both doing essentially the same thing. I was very pleased to see that I could do the cross-over things mentioned above.

BUSINESS PROGRAMS NEEDED We occasionally receive a request for some sort of business program, a sort of difficult thing to do with the limited memory available in the Arcade. Those of you with a talent for accounts receivable and that kind of thing should be able to generate something using one or the other of the memory addition systems now available - (the Blue Ram and the Viper).

ZGRASS - the language of the Add-Under. We reported on p. 13 of Vol 3, of the availability of the DATAMAX UV-1 computer, which utilizes Dr. DeFanti's Zgrass language. The November issue of Creative Computing has an interesting article by one of the purchasers of the UV-1, and his experiences with the language. Note that some of the feature commands (SNAP, CIRCLE) are available in the Extended Basic, offerred by both Blue Ram and Viper manufacturers.

© 1981 R.FABRIS

ASTROVISION BASIC is the new Basic cartridge now appearing on the market. The original Bally Basic is not going to be generally available any more (we have a few here).
We will certainly continue to support the older basic because there is a large world out there with them. Fortunately, the conversion required is quite minimal, and unless we identify otherwise, you can assume that whatever we print will work on both basics. We will use BB to identify Bally Basic and AB to identify AstroVision Basic programs where necessary. A similar code will be used when we list programs in Extended Basic or Zarass languages.

CONVERSION of formats. What I'm speaking about here is the method of changing a program written in Bally Basic that tape-loads at a 300 baud rate into the AstroVision Basic tape loading rate of 2000 baud. The manual that comes with the AB cartridge has a program in machine language that does this. In essence, one enters this program into the AB cartridge by means of a tape and the:RUN command. Then the BB program is tape-loaded into the BB cartridge, one key is pressed and presto! the job is done. The program can now be tape-loaded at the 2000 baud rate. The manual wisely suggests that you make a number of copies of this conversion program for safe-keeping. At the moment, we prefer that all programs be submitted in Bally Basic, as we have not found a method to *PRINT an output to a printer in the AB format. (hackers take note)

MACHINE CODE PROGRAMMING is feasible using Bally Basic by going through some relatively inefficient ways to input the required data, segments of which have appeared in the ARCADIAN over the past three years.. This has been resolved by the Bit Fiddlers, who announce the availability of a new cartridge that will do all the work for you. See their ad.

This cartridge is intended to be a tool for the serious programmer and hardware type ('hacker'). A certain amount of familiarity with machine language principles (hex notation, how to look up instruction codes in microprocessor manuals, etc.), would allow a user to work with it almost immediately. The manual supplied with it is an attempt to bridge some of the gap between the novice and the experienced machine language type, but is not meant to take the place of a Z-80 programming handbook. Likewise, publications having information on the Bally on-board routines are a must if one plans to use the Machine Language Manager effectively. These routines are available in the document 'Executive Software', developed by Tom Wood, at $3.00 first class, from the ARCADIAN.

In order to get a reasonable listing on the TV screen, the MLM uses its own 3x5 character set (very similar to that used in the Extended Basic). This smaller set places 39 chaacters on a line, but eats up a lot of memory in the unit. What is left is support of a printer and external keyboard through the cassette interface and the ability to produce self-starting program tapes.

Next in line will be game tapes to go along with the cartridge, with the first due in January. Then utilities to add to the machine language toolbox, and if enough people who have a keyboard also want a word processor, then a rudimentary one could be developed.

The Chicago group will have a copy at their next meeting for members' review.

Home Video Game Invasion Has Begun

By Dan Dorfman

You probably never heard of Astrovision, Inc. and there's no reason you should have; located in Columbus, Ohio, it's a mere 14½ months old, privately owned and its sales last year were just over $1 million. But its investment implications — based on what's happening to the company's business — are enormous. And obviously a number of corporate biggies think so. Example: International Telephone & Telegraph is quietly talking to the company about a joint venture in Europe. CBS, a little over a month ago, held hot and heavy talks that might have led to its acquiring the company. And RCA also looked into a joint venture with the firm.

Mr. Dorfman

The reason for all this interest: tiny Astrovision is in probably the hottest growth business in the country — the exploding home video game field.

In August of '80, Astrovision acquired the rights to the home video business of Bally Mfg. Co. — a video machine which attaches to the TV set, plus 25 software packages of various games — for $2.3 million, plus royalties.

To date, the company's business has been going through the roof. Astrovision vice president Ray George estimates '81 sales at between $12 million and $15 million — with net profit running a little over $1 million. And with a current order backlog of about $55 million, he figures '82 should produce at least $100 million in sales and around $10 million in net earnings.

As George sees it, "There is a game craze over the country, in fact all over the world, and we intend to be a leader in it."

George regards the Bally sale of its home video game business to Astrovision as a "giant blunder" and suggests the company goofed badly by treating the operation as a stepchild.

He may be right, but Bally, which is the kingpin in the arcade and coin-operated pinball and video game business, is apparently taking steps of remedy that. Sources tell me that Bally, within the next 60 days, will announce its intent to produce software packages expressly for home video machines.

Whether Astrovision — which talks optimistically of going public in early '82 and being a billion-dollar company in '85 — continues to achieve meteoric growth, and in fact even survives in the face of the almost certan surging competition, remains to be seen.

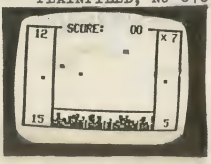
"If you tie in the personal computer, which is what many people will use to play these games, this home video revolution will be the single hottest investment area over the next three to five years," predicts Lee Isgur, Wall Street's top entertainment specialist.

The 44-year-old Isgur, an analyst at Paine Webber Mitchell Hutchins, tosses out some glowing numbers to support his case. By 1985, he figures hardware sales — the game machines which currently retail at $199 to $299 (although there's heavy discounting) — will represent a worldwide volume of between $5 billion and $10 billion; software, (generally $20 to $25 a cartridge), $5 billion to $15 billion.

FINANCIAL NEWS The above column was included in a number of financial pages of the country's newspapers on Oct. 29. Mr Isgur appeared on the PBS TV show, Wall Street Week on November 20, at which time he included Bally as one of his three 'buy' recommendations.

Super Software

BOX 702
PLAINFIELD, NJ 07061



Tape 10

Falling Stars!

Radiocative stars are decending onto the city below. If the city is hit, many lives will be lost. It's up to you to protect the city by destroying the stars before the reach the surface. If you enjoy 'Missile Command', you'll love 'Falling Stars' by Super Software. The speed and graphic will astound you. Also includes 'Laser Battle'. Only $10.00 from Super Software. Order yours and have hours of fun.

Send For Free Catalog

Noted August 31, 2018 by BallyAlley

This empty area is missing a 1/4 page ad for Machine Language Manager.

It was reused on page 26.

I-O SWITCH FOR NEW BALLY BASIC CARTRIDGE

by Steve Walters

The new Bally (Astrovision) Basic cartridge has a single audio jack for tape input-output. This provides for no switch the audio cable back and forth between the tape recorder's "mike" jack (:PRINT) and the "ear" jack for input (:INPUT). This cable switching is a nuisance, and is easy to forget.

I have overcome this by providing a switch on my computer to eliminate the physical switching of the audio cables. This required a modification of my tape recorder also.

Computer-mounted switch. Mount a double-pole double-throw (DPDT) miniature-size switch (like Radio Shack No. 275-614) in a convenient location on the computer case. Make sure there is room inside the case for the switch and its wires to clear other components.

Run three audio cables through holes at convenient locations in the case and connect to the switch as shown in the illustration. Cables A and C must be long enough to reach the jack on the New Bally Basic Cartridge, and Cable A and C must be long enough to reach your tape recorder. A good source for the audio cables is a six-foot extension cable with a miniature phone plug on each end (like Radio Shack No. 42-2420) which can be cut in half to make two of the required cables.

A variation which may be preferred for some equipment set-ups is to connect Cables A and C from the switch to miniature phone jacks (center wire to lug #1 and shielding to lug #2) mounted in the side of the computer case. The computer can then be connected to the tape recorder by audio cables with plugs on each end.

Tape recorder modification. The normal "ear" jack on a tape recorder provides a signal during playback for private listening, and also during recording for monitoring. This signal interfers with the "mike" signal when both cables are plugged in, which is the New Basic Cartridge, and prevents a clear recording of the computer's output. We need a tape recorder that receives a signal from the tape recorder only during playback, and this is available from the speaker output, since it is activated on playback but not during recording.

Mount a closed-circuit type miniature phone jack (like Radio Shack No. 274-253) on the tape recorder case, near the "mike" jack if possible. Again, make sure there is space inside the case for the jack to clear other components. Then wire as follows:

(1) Unsolder either one of the two wires from the tape recorder's speaker, and connect it to lug #2 on the new phone jack (see illustration).

(2) Connect a wire between lug #1 of the phone jack and the speaker lug which still has a wire on it.

(3) Connect a wire between lug #3 of the phone jack and the speaker lug from which you removed a wire in Step (1).

This "new ear" jack receives a signal only on playback, and turns the speaker off when the cable is plugged in. The normal operation of the recorder is not affected. Use the Cables A and C into the tape recorder's "mike" and "new ear" jacks, and label them accordingly. Remember to reverse the cables according to how you plunged in the enabled switch at :INPUT and :PRINT. The "mike" cable will remind you which cable is which, just like the Old Basic interface cables.

Computer-mounted Switch

"New ear" jack in tape recorder

Parts List:

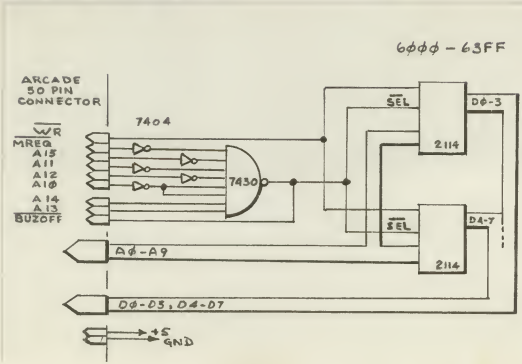
2 Extension cables (mini plug to mini plug)	Radio Shack No. 42-2420	$2.29 each
3 Mini phone jacks (closed-circuit type)	Radio Shack No. 274-253	$1.39 for 3
1 DPDT mini switch	Radio Shack No. 275-614	$2.19

Plus a little wire and solder.

```
  1 .
  2 .RND (ART)
  3 .BY SUPER SOFTWARE
  4 .BOX 702
  5 .PLAINFIELD, NJ 07061
  6 .
  7 .PRESS 'GO' TO CLEAR
  8 .
  9 CLEAR
 10 X=RND (42);LINE X,X,4;LINE -X,X,3;LINE X,-X,3;LINE -X,-X,3;LINE X,X,3
 15 IF &(23)RUN
 20 Y=RND (42);LINE Y,Y,4;LINE Y,-Y,3;LINE -Y,Y,3;LINE -Y,-Y,3;LINE Y,Y,3
 30 IF RND (7)=1BC=RND (256);FC=BC+12+RND (8)b32
 40 IF RND (5)=1A=RND (8)b10;BOX 0,0,A,A,RND (2)+1
 50 IF RND (5)=1GOSUB 100
 60 GOTO 10
100 A=RND (20);B=RND (20);C=RND (20)b2;BOX A,B,C,C,3;BOX -A,B,C,C,3;BOX -A,-B,C
,C,3;BOX A,-B,C,C,3;RETURN
150 LINE -Y,-Y,3
```

SAFETY MESSAGES are presented to McCormick & Co. employees in the Baltimore plant of the spice-producing corporation by means of a Bally Arcade. Subscriber Lou Gubernatis programs his Arcade with applicable safety messages and encloses them in an attention-getting visual display which is then placed on the cafeteria television screens by means of video tape. The company is quite enthused over the increased effectiveness of Lou's approach.

MICRO MEMORY EXPANSION is illustrated below. This schematic will enable you to add 1K of static RAM to the Arcade, courtesy of Mark Keller. This is probably the limit of addition that can be supported by the existing power supply.

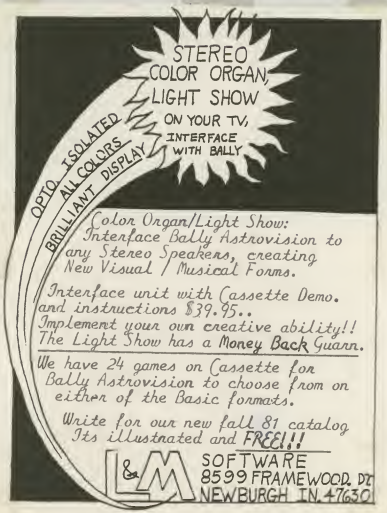


PRINTED MATERIAL that has been obtained over the last three years is listed below. Copies are available at the costs indicated, postpaid. Some of our more technically oriented subscribers have been successful in digging into the hidden areas of the Bally system, and have agreed to share their findings with us.

o EXECUTIVE SOFTWARE, or a listing of the ROM cartridge, as disassembled by Tom Wood. Part of the document lists the ROM subroutines that are executed by an RST 38H instruction, while the second part contains the listings from 0000-1FFF 27 pages, $3.00

o BASIC CARTRIDGE LISTINGS - The Tiny Basic cartridges taken apart by Tom Wood : the Bally Basic listing is 63 pages, $7.00; while the AstrVisiob Basic is 70 pages, $7.50 Operating instruction (not the Manual that comes with the cartridge) $2.50

o BALCHEK A program was developed by the Bally software engineers which 'looked at' the operation of the printed circuit board and determined if all was well, or it would identify the problem area. The program was entered into a 2716 chip, and a couple of 7-segment LED drivers and LEDs added to make up a package. All boards were inspected by this machine prior to insertion into the box. Tom Wood ran this through his disassembler and provided us with the listing, while I have added the sparse instructions. 60 pages, $7.00 (NOTE - Dick Belton 301-488-2806 can provide either the ROM cartridge or complete unit.)



EXTENDED MEMORY is mentioned a number of times, and will be even more so as time goes by. Two major problems exist with the Arcade - the lack of a full size keyboard, and the extremely small memory (1.8K). Some very clever programming has taken place over the last three years to work around the memory problem, but there is no substitute for memory space. To alleviate this, Perkins Engineering brought out the Blue Ram 4K memory addition, which is housed in a small blue box that attaches directly to the 50-pin expansion connector at the back of the Arcade (snap out the segment between the two inner hand controller ports). In addition, a keyboard can be attached to the Blue Ram to overcome the other shortcoming. A second company, Alternative Engineering, is also providing a memory addition on a larger scale, with a 16K RAM in a relatively large box that allows for future additions. It too has an attachable keyboard. Each of these vendors also makes available a new language for the Arcade, generically called "Extended Basic". This language is essentially identical between the two vendors so that programs written on one system will operate on the other. There are some operational differences, the Blue Ram version is provided on a ROM cartridge while the Alternative Engineering version is on a tape. We will be supporting this language with programs, tutorials, etc., as we do the two Tiny Basics. Both vendors frequently advertise in the ARCADIAN.

```
>*PRINT ;LIST
 1 .     "  VIPER TEST PATTERN  "
 2 . AN EXAMPLE OF THE NEW EXT. BAS. 1.0
 3 .     ALTERNATIVE ENGINEERING
 4 .          P.O. BOX 128
 5 .       GARDINER , MAINE 04345
 6 .
10 CLEAR ;BC=0
30 DATA A,0,0,0,0;E=RND (7)
40 FOR Z=1TO RND (25)+15STEP RND (2)+1
50 CIRCLE 0,0,Z,E+1;CIRCLE 0,0,Z-10,E-1;CIRCLE 0,0,Z+10,E+2;BOX -A,B,C,D,E;BOX A
,-B,C,D,E;BOX 0,0,Z-15,Z-15,E-2;BOX -A,-B,C,D,E;BOX A,B,C,D,E;A=A+2;B=A-1;C=C+2;
D=C;NEXT Z
60 GOTO 30
```

This is one of the VIPER programs that demonstrates Extended Basic. Those of you with the Blue Ram Extended Basic can get a colorful display with this...

NUCLEAR MATH additions were sent in by Don Gladden, to supply the constants that are needed. After loading the program, type in the following without using a line number:

```
C=30;M=20;O=34;P=28;R=29;V=470;W=32;Y=1000
```

Then run the program. Now, since the caonstants above are not part of the program listing, they won't print out if you use LIST or PRINT. If you want to save this program on tape, you will have to also load the constants. To do this, type in

```
:PRINT;NT=1;LIST;PRINT"C=30;M=20;O=34;P=28;R=29;V=470;W=32;Y=1000;
:RETURN;RUN
```

and then press GO to get the program listed to tape.

STARFIGHTER sets the screen up as a viewport to space, where an even dozen alien ships are waiting for you. You will see a set of crosshairs, and then an alien ship will appear. Move the joystick in the direction of the ship to line up the ship in the sight. Pull the trigger to fire. You can only get a hit if the ship is in dead center (not easy at all) You are in trouble if your shields get to 0%, or the temperature goes up to 100.

```
 1 .
 2 .STARFIGHTER
 3 .BY JAMES WINN
 4 GOTO 30
 5 &(16)=0;&(19)=0;&(20)=0;&(21)=0;&(23)=0;RETURN
 30 CLEAR ;NT=0;BC=23;FC=0;A=12;B=100;C=1001;D=0;E=0;F=0
 40 CY=39;PRINT "FUEL          SHIELDS 100%
 50 CY=-39;PRINT "TEMP
 60 X=162;Y=69;FOR Z=1TO 5;X=X-2;Y=Y-2;BOX 0,0,X,Y,3;NEXT Z
 70 FOR Z=-10TO 10;BOX Z,0,11,1,3;BOX 0,Z,1,11,3;NEXT Z;BOX 0,0,15,15,1;GOTO 39
0
 80 X=RND (100)-50;Y=RND (40)-20;G=RND (4);IF G#1GOTO 130
 90 BOX X,Y,8,2,3;BOX X,Y-1,6,1,3;BOX X,Y,2,3,3;H=JX(1)b8;I=JY(1)b8;&(16)=200;&
(19)=3;&(20)=255;&(21)=1
 100 IF TR(1)GOTO 330
 110 IF X<10IF X>-10IF Y<10IF Y>-10H=JX(1)b2;I=JY(1)b2
 130 IF F>82IF E=0E=1;CX=-6;CY=-39;PRINT "TEMP CRITICAL
 140 IF F<83IF E=1GOTO 390
 150 C=C-1;F=F-1;IF F<0F=0
 160 IF C<0C=0
 170 CY=-39;CX=-44;PRINT #1,F;CX=-40;CY=39;PRINT #1,C
 175 IF A=0GOTO 470
 180 IF C=0CY=39;PRINT "NO FUEL";GOTO 440
 190 IF F>100GOSUB 5;CX=-6;CY=-39;PRINT "OVERHEATED!!!";GOTO 450
 200 IF G#1FOR Z=1TO 200;NEXT Z;GOTO 80
 210 IF RND (6)=1GOTO 240
 220 IF TR(1)GOTO 330
 230 BOX X,Y,8,2,3;BOX X,Y-1,6,1,3;BOX X,Y,2,3,3;X=X+RND (3)-2-H;Y=Y+RND (3)-2+I

 235 IF (X>65)+(X<-65)+(Y>23)+(Y<-23)GOSUB 5;G=0;GOTO 200
 237 GOTO 90
 240 &(21)=255;K=X;L=Y;M=Xc8;N=Yc8;FOR Z=1TO 8;BOX K,L,Z,Z,3;BOX K,L,Z,Z,3;&(23)
=Zb10;K=K-M;L=L-N;NEXT Z;O=RND (3)
 250 IF O#1FOR Z=9TO 33STEP 4;BOX K,L,Z,Z,3;BOX K,L,Z,Z,3;K=K-M;L=L-N;NEXT Z;GOT
O 280
 260 &(16)=0
 270 FOR Z=6TO 61STEP 11;BOX 0,0,Z+60,Z,3;BOX 0,0,Z+60,Z,3;NEXT Z;FOR Z=1TO 35;F
C=84;FC=0;NEXT Z
 280 GOSUB 5;IF O#1GOTO 220
 290 IF B=0BOX 28,39,70,9,3;GOTO 460
 295 IF RND (4)=1B=B-10
 300 F=F+11;B=B-10;IF B<0B=0
 310 CX=50;CY=39;PRINT #1,B,"%";IF F>100GOTO 160
 320 GOTO 230
 330 GOSUB 5;C=C-50;F=F+11;&(19)=1;&(20)=7;&(21)=15
 340 P=0;Q=-24;R=24;S=16;FOR Z=1TO 8;Q=Q+3;BOX P,Q,R,S,3;BOX P,Q,R,S,3;R=R-3;S=S
-2;NEXT Z
 360 GOSUB 5;IF PX(P,Q)=0A=A-1;D=D+100;GOTO 380
 370 GOTO 310
 380 P=1;Q=-1;&(21)=255;&(23)=255;FOR Z=1TO 6;P=P+2;Q=Q+2;BOX 0,0,P,P,2;BOX 0,0,
Q,Q, 1;NEXT Z;BOX 0,0,15,15,1;GOSUB 5;E=0
 390 CX=-6;CY=-39;PRINT #1,A," ALIEN",;IF A#1PRINT "S",
 400 PRINT " LEFT";IF F>100GOTO 160
 410 IF A=0GOTO 160
 420 IF E=1E=0;GOTO 150
 430 GOTO 80
```

James Winn
Box 98
Boiling Springs NC 28017

```
 440 FOR Z=30TO 122;BC=7;BOX -58,39,45,9,3;&(19)=Zb2;&(21)=15;NEXT Z;GOSUB 5;GOT
O 470
 450 BC=83;FOR Z=1TO 131;BOX 0,-39,160,9,3;&(16)=5;&(19)=210-Z;&(21)=15;NEXT Z;G
OSUB 5
 460 FOR Z=1TO 35;BC=0;&(21)=255;&(23)=255;BC=83;NEXT Z;GOSUB 5
 470 IF A#0C=0
 475 D=D+C+B-F;IF D<0D=0
 480 BOX 0,-24,140,9,2;CX=-45;CY=-24;PRINT "YOUR SCORE",#5,D
 490 IF TR(1)RUN
 500 GOTO 490
```

Orbit Demo is a tutorial program for the space game programmers. You can see the results of the force of gravity on your spacecraft. Rem statements "." are included to show how the circle routines work. The followins numbers will make an orbit or circle, X=0,Y=21,D=-6,E=0. There are several other combinations that will make different size orbits. Other number combinations cause elliptical orbits or wraparound takes effect. Have fun with this one. Program by Ron Picardi.

```
  1 .
  2 .
  3 .ORBIT DEMO
  4 .RON PICARDI
  5 GOSUB 1000;CLEAR ;PRINT "TR(1) TO TRY AGAIN";GOTO 100
 10 .USE FOR MAIN BODY GOSUBS
 20 &(17)=Xb2;&(18)=Yb4;RETURN
100 .MAIN BODY
110 BOX X,Y,5,1,3;BOX X,Y,1,5,3;.YOUR SHIP
120 U=X;V=Y;.SAVE OLD POSITION
125 .GRAVITY
126 BOX 0,0,3,3,3
130 IF X>0D=D-1
140 IF X<0D=D+1
150 IF Y>0E=E-1
160 IF Y<0E=E+1
161 IF X>75X=-75
162 IF X<-75X=75
163 IF Y>35Y=-35
164 IF Y<-35Y=35;.WRAP AROUND
165 X=X+D;Y=Y+E;.ADD NEW LOCATION
170 .REST OF PROGRAM
175 IF TR(1)GOTO 5
176 GOSUB 20
180 .ERASE AND RETURN
190 BOX U,V,5,1,3;BOX U,V,1,5,3;GOTO 100
1000 .SET ORBIT
1005 &(22)=0
1010 INPUT "INPUT X",X;INPUT "INPUT Y",Y
1015 INPUT "INPUT D",D;INPUT "INPUT E",E
1020 &(22)=200;&(20)=Xb2;RETURN
>
```

Sell Blue Ram unit with documentation and utility and diagnostic cassette. Asking $150 for all, hardly used. Drew Davidson 4945 N.Calle Esquina, Tucson, AZ, 85718

ARCADIAN T SHIRTS Airbrushed Logo in full color. $8. plus $1 postage/handling. Send sizes and check to Don Gladden, 59400 Nine Mile Rd. So.Lyon, MI 48178

W & W Software Sales new address: 355 South Main St., Marine City, MI 48039

FOR SALE: Bally Arcade with 2 hand controllers, Bally Basic, and 11 videocades. Asking $300. Terry Daly, 3048 So. Poplar, Chicago, IL 60608

ADD-UNDER NEWS - Late word has it that printed circuit board design is now undergoing verification, and then a small number of boards will be "stuffed" with parts and checked out. If all goes well, then production will get under way. Early 1982 still looks like a good date for this long-awaited hardware.

ARCADIAN
Robert Fabris, remembering '41
3626 Morrie Dr.
San Jose, CA 95127-9990

The SOURCE
TCD 959

```
 1 CLEAR ;J=0;K=0;L=1;M=1;G=1;F=1;NT=0;GOSUB 700
 2 CY=20;CX=-40;PRINT " D&D SPEEDWAY
 3 PRINT ;CX=-10;PRINT "LAPS
 4 PRINT ;CX=-20;PRINT "#1 =";CX=-20;PRINT "#2 =
 5 GOSUB 500
 9 BOX 0,0,160,88,3;BOX 0,0,150,78,3;BOX 0,0,100,55,3
10 BOX 0,-16,50,17,3
11 GOSUB 800+Rb10
12 &(16)=50;&(17)=154;&(18)=124;&(20)=4;&(22)=222
19 A=58;D=65;B=-27;E=B
20 Z=(KN(1)+128)c20+1;W=(KN(2)+128)c20+1
21 IF JX(1)=1A=A+Z;F=0
22 IF JX(1)=-1A=A-Z;F=0
23 IF JY(1)=1B=B+Z;F=1
24 IF JY(1)=-1B=B-Z;F=1
25 IF JX(2)=1D=D+W;G=0
26 IF JX(2)=-1D=D-W;G=0
27 IF JY(2)=1E=E+W;G=1
28 IF JY(2)=-1E=E-W;G=1
29 S=A;T=B;IF F=0GOSUB 910;GOTO 31
30 GOSUB 900
31 IF (PX(A,B)=0)+(ABS(A)>72)+(ABS(B)>37)BC=90;GOSUB 950;BC=172;GOSUB 105
32 IF A>0IF L=0J=J+1;GOSUB 500;L=1;IF J=QGOTO 960
33 IF A<0IF B>20L=0
34 S=D;T=E;IF G=0GOSUB 910;GOTO 36
35 GOSUB 900
36 IF (PX(D,E)=0)+(ABS(D)>72)+(ABS(E)>37)BC=134;GOSUB 950;BC=172;GOSUB 115
37 IF D>0IF M=0K=K+1;GOSUB 500;M=1;IF K=QGOTO 960
38 IF D<0IF E>20M=0
40 S=A;T=B;IF F=0GOSUB 910;GOTO 42
41 IF F=1GOSUB 900
42 S=D;T=E;IF G=0GOSUB 910;GOTO 50
43 IF G=1GOSUB 900
50 GOTO 20
105 S=A;T=B;IF F=0GOSUB 910;GOTO 107
106 GOSUB 900
107 S=58;T=-27;L=1;GOSUB 900;A=S;B=T;F=1;RETURN
115 S=D;T=E;IF G=0GOSUB 910;GOTO 117
116 GOSUB 900
117 S=67;T=-27;M=1;GOSUB 900;D=S;E=T;G=1;RETURN
500 CY=-12;CX=10;PRINT #1,J;CX=10;PRINT #1,K
510 RETURN
700 PRINT "  JOYSTICK STEERS CAR";PRINT "  KN ADJUSTS SPEED
710 PRINT ;PRINT "  INPUT TRACK";PRINT "  (1=EASY TO 5=HARD)";R=KP-48
715 IF (R<1)+(R>5)GOTO 710
720 INPUT "  INPUT # OF LAPS";Q;IF QCLEAR ;BC=172;RETURN
810 RETURN
820 S=62;T=0;GOSUB 900;S=-62;GOSUB 900;RETURN
830 GOSUB 820;S=0;T=33;GOSUB 910;T=-33;GOSUB 910;RETURN
840 T=-30;FOR S=-72TO -52STEP 10;T=T+5+RND (10);GOSUB 900;NEXT S;S=0;T=33;GOSUB
910;T=-33;GOSUB 910
841 T=-30;FOR S=52TO 72STEP 10;T=T+5+RND (10);GOSUB 900;NEXT S;RETURN
850 GOSUB 840;S=-50;T=30;GOSUB 910;S=45;GOSUB 910;T=-30;GOSUB 910;S=-50;GOSUB 9
10
```

D & D SPEEDWAY

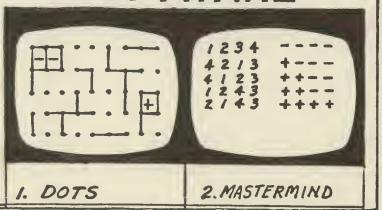
Mario DeLaura
87 Close Hollow Dr.
Hamlin, NY 14464

```
 851 S=-30;T=37;GOSUB 910
 852 S=25;T=-37;GOSUB 910;RETURN
 900 BOX S,T,2,5,3;BOX S+1,T-1,1,1,3;BOX S-2,T-1,1,1,3;BOX S+1,T+1,1,1,3;BOX S-2
,T+1,1,1,3;RETURN
 910 BOX S,T,5,2,3;BOX S-1,T+1,1,1,3;BOX S-1,T-2,1,1,3;BOX S+1,T+1,1,1,3;BOX S+1
,T-2,1,1,3;RETURN
 950 FOR P=0TO 50:&(16)=P:NEXT P:&(21)=255:&(23)=255:&(21)=0:&(23)=0:RETURN
 960 &(16)=0:&(17)=0:&(18)=0:&(20)=0:&(22)=0
 965 CLEAR :BC=7:CY=0:CX=0:IF J=QPRINT "1
 966 IF K=QPRINT "2
 970 FOR Y=-30TO 30STEP 20:FOR X=-70TO 70STEP 20:BOX X,Y,10,10,3:NEXT X:NEXT Y
1010 FOR Y=-20TO 20STEP 20:FOR X=-60TO 60STEP 20:BOX X,Y,10,10,3:NEXT X:NEXT Y
```

```
 10 CLEAR
 11 T=0
 15 BC=0;FC=12
 16 P=0
 19 P=P+1
 20 FOR A=1TO 81STEP 2
 30 BOX 0,0,A,A,3
 34 IF FC=32764FC=124
 35 FC=FC+8b2
 36 IF P=4IF A=77GOTO 290
 40 NEXT A
 50 IF T<7GOTO 290
 55 Q=RND (4)
 56 IF Q=1GOTO 350
170 FOR C=-19TO 20
180 D=Cb2
190 BOX C,D,2,2,3
195 BOX D,C,2,2,3
196 IF FC=32764FC=124
197 FC=FC+8b2
200 NEXT C
210 FOR C=-20TO 19
220 D=-(Cb2)
230 BOX D,C,2,2,3
240 BOX C,D,2,2,3
270 NEXT C
280 GOTO 19
290 FOR C=-40TO 40STEP 2
300 BOX 0,C,80,1,1
 305 NEXT C
 310 FOR C=-40TO 40STEP 2
 320 BOX C,0,1,80,1
 325 NEXT C
 327 P=P+1
 328 IF P=7GOTO 20
 330 T=T+1
 335 IF T<5GOTO 350
 340 GOTO 16
 350 FOR C=1TO 80STEP 8
 360 BOX 0,0,C,C,3
 370 NEXT C:GOTO 20
```

The above interesting graphics program is by Ken Springsteen,
1935 Winding Hill Rd.#1008 Davenport, IA 52807

EDGE SOFTWARE



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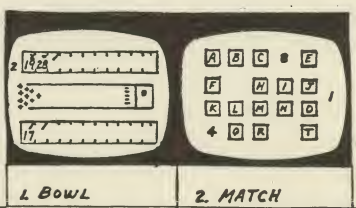

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**AD

SFP has three original Bally Basic in/orig. carton at $24.95 each. Also have all Bally/Astrovision Videocades (that are released) in stock, at a discount to ARCADIAN readers. Revolving Cassette Rack at $5.95 holds 20 Videocades in cases, or 32 cassettes without cases. Reg. Price $7.95 .
CA add 6% tax. For Free price list; SFP D-A, 1064 N. Alta, Dinuba, CA. 93618 (209) 591-0555.

ARCADIAN

Robert Fabris, Holiday well-wisher
3626 Morrie Drive
San Jose, CA 95127-9990

The SOURCE
TCD 959

CONSUMER ELECTRONIC SHOW, that semi-annual get-together, is two weeks away. Dick Hauser and I will be at Las Vegas to see all the new and marvelous things the Electronics Industries have for us to buy. We'll be at the AstroVision booth to get acquainted and re-acquainted with dealers, distributors, buyers, etc., and the AstroVision team. Full report next time.

INCENTIVE While we'll be talking to top level people in the distributing chain, it may be a while before the information trickles down to the individual retailer and his sales personnel. So I'd like to enlist your support in spearheading an attack on the working troops - make them aware of: 1) the ARCADIAN; 2) the existance of the Basic cartridge and what it can do; and 3) the existance of our advertisers and their products. Accordingly, we are making up a little package of this data and would like you td give copies to any retailers in your area. This data will be coded, and when the retailer contacts us, we'll send you a buck for your trouble. The package will be completed when we get back from Las Vegas.

NEW USER GROUP is forming up in the Eastern part of Cleveland. Contact Jack Walters, 630 Broadway Ave., Bedford, OH 44146 (439-2542) for details as to meeting dates, etc. The place will be his store (Visual Aides), which will be a fully stocked Arcade dealer, including third-party programs on tape from our advertisers (and possibly others - are there any?).

CONTEST STORY: There was no contest last month because there were no entries. The story is a little different this time - lack of time. I had to rush this into print because the printer was taking the week off for the holidays, and there wasn't enough time to get the tapes to the judges. The contest will be back next month - but entries are always needed. And we need 'regular' programs as well.

MACHINE CODE

The advent of the Bit Fiddler's cartridge (check the ad on p.26 and the review) now allows us to bypass the Basic cartridge entirely and to communicate directly with the Z-80 microprocessor. Previously, we had to utilize some of the hidden (unpublished) features of the Basic cartridge in order to access the Z-80 to use machine code. The first of a number of articles about our success in so doing will be found in Volume 1, page 25. Subsequent articles and programs brought us to the point in the last Volume where we could generate characters, and where the computer was doing most of the work of entering the code.

Now by replacing the Basic cartridge with the Bit Fiddler's product, we no longer have to use "work-around" techniques.

The Z-80 microprocessor operates by means of a set of instructions that tell it what to do in a highly defined way. These directions are supplied by the chip manufacturer in a document called the "Z-80 Instruction Set". We would also need to understand the principles of machine code operation in order to utilize the instructions properly. We plan to provide some introductory material in these pages for those interested in this subject.

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TUTORIAL MAGIC REGISTER by Brett Bilbrey

The Bally Arcade has a very powerful graphics register that not very many people know about, or know how to use. Let's find out what it is, where it is, what it does, and mostly, how we can use it. But first its name: MAGIC REGISTER

The Magic Register is a hardware register (storage space) that exists in the custom chips. It is port addressable, which means it is accessed by the &(X)=Y construct from Basic, or the OUT command from machine language. It is classified as an output port which means that values may only be sent to it, never received from it. It has been assigned the value of 12decimal, or 0Chex.

I hope to show in the following text and examples how you can make use of it. But first lets start with its principle of operation. The Magic system is enabled (set into operation) when data is written to a memory location (X) between 0 and 16383dec. or 0 to 3FFFhex. Since the first half of this area is the ROM operating system and the second half is reserved for the ROM game cartridges, we cannot write data to this area. If we try to write to this area, the Magic system knows to add 16384 to our location (X), and instead write to the new location (X+16384) the data modified by the contents of the Magic Register. The type of modification done is determined by the bits that are set in the Magic Register. The bits are assigned as follows:

Bit 0 Least significant bit of shift amount
1 Most significant bit of shift amount
2 Rotate (not supported by our Arcade)
3 Expand
4 OR
5 XOR
6 Flop
7 Not used

The order in which Magic functions are performed is as follows: Expansion is done first, then Rotation or Shifting, then Flopping, and lastly OR or XOR. As many as four functions can be used at any one time, and any function can be bypassed. Rotate and Shift as well as OR and XOR can not be done at the same time.

Next I will give a quick explanation of the Magic functions. For a more detailed explanation I refer you to the Operating System Manual.** When using the shifter, the data will be shifted 1,2, or 3 pixels to the right, depending on the value of bits 0 and 1 of the Magic Register. Rotate can only be performed by the commercial version of the Arcade. Expand takes the 8 bits of data to be written and expands it to 16 bits by making a 0 bit into a pixel defined by bits 0 and 1 of the expand register, and a 1 bit into a pixel defined by bits 2 and 3 of the expand register. When using the expand option, it is necessary to prepare the expand register (output port 19hex or 25dec) to determine in what way a bit will be expanded into a pixel. This is useful for storing a two-color pattern in one-half the normally required memory space. The OR and XOR functions will first read the memory location (X+16384), then OR or XOR the data that we want to write there with the data that was already there, and then store the result in the location (X+16384). Flop exchanges pixel 0 with pixel 3, and pixel 1 with pixel 2.

Now that we know what the Magic Register can do, let's try an example. Since the Magic Register is a hardware register, it is usable with both machine language and Basic. To make the example simpler, we will do it in Basic.

For ou we will use the XOR function. I will leave the other functions for you to experiment with on your own.

What can we do with XOR? Well, if you have graphics on the screen and you want to place another pattern on the screen without erasing the existing graphics, you can do this by using the XOR function when you write the second pattern to the screen. (Examples of this would be the players moving on the field in baseball, or the galaxians moving over the stars without erasing them.)

By writing the second graphic to the screen again in the same place using the XOR function, we now 'erase' our second pattern and leave the screen like we started. So lets set up our example to see this happen. First we set the screen parameters and put a box on the screen. This is our 'original' pattern. Then we set the Magic Register for XOR (MAGIC = 00100000) which is 20hex or 32dec. Then we will POKE some values to the screen to write our second pattern. (NOTE: using the PRINT, BOX, or LINE command in Basic will clear the Magic Register, this is why we must POKE the second pattern.) Now we see a small pattern in the box and if we POKE the same second pattern to the same place using the XOR function, we will erase our small pattern and leave the box as when we started.

The first program example will POKE, then erase, our small pattern over and over (pressing any key will cause the pattern to appear and disappear as the key is repeatedly pressed.) the second program will jump the pattern across the screen without messing up what was there to start with. Hopefully this tutorial will help you to understand a bit (pun intended) more about what the Magic Register is and what it can do.

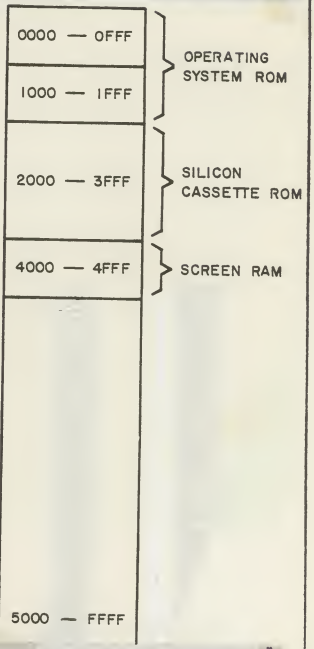
Brett Bilbrey 14430 Barclay, Dearborn, MI

```
10 CLEAR
20 &(9)=40
30 FOR A=1006TO 1032;FOR B=1TO 2
40 %(A)=60;%(A+40)=215;%(A+80)=255;%(A+120)=40;%(A+160)=195
50 IF B=1 FOR D=1TO 100;NEXT D
60 NEXT B;NEXT A;B=KP;GOTO 20
>
```

```
10 CLEAR
20 &(9)=0;&(0)=0;&(1)=22;&(2)=66;&(3)=156
30 BOX 0,0,50,50,1
40 &(12)=32
50 A=1016;%(A)=60;%(A+40)=215;%(A+80)=255;%(A+120)=40;%(A+160)=195
60 B=KP;GOTO 40
>
```

**This document, also known as The Manual of Hardware and Software, was written by the Bally software design engineering team of Dave Nutting Associates. It covers subroutines, machine operations, and details of the interior workings, plus some specifications of the custom chips. The second half includes disassembled listings for virtually everything. Two points - it talks to the commercial version at times, and just how applicable it is to the current production is not known. Over 300 pages, it is available from the ARCADIAN at $35, postpaid.

This chart (taken from the Manual referenced on page 25) shows the allocation of memory, and illustrates the location called Magic Register.



Z-80 MACHINE LANGUAGE?

That's right! A NEW cartridge for programming the BALLY ARCADE entirely in Machine Language. Now you can have:

- Fast graphics--Better animation
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- The capability to produce Cartridge Quality program tapes*
- Easier access to all on-board subroutines
- Complete control over all facets of the BALLY ARCADE

All this and MORE with the

Machine Language Manager for the **Bally® Arcade**

$54.95†

From
The Bit Fiddlers
P.O. Box 11023
San Diego, CA 92111-0010

*Cassette requires 300 Baud interface.

† Includes postage & handling.
Calif. residents add 6% sales tax.

W & W Software have temporarily closed down, primarily due to a printer problem, plus the recent move. We'll let you know when they are up and running again.

GREEN SHEET error. Those of you new subscribers who have copies of the green program listings may find a difficult-to-read segment in line 233 of page 4. The second box command should read BOX 34,4,12,9,L

BALLY BACK? The Dorfman article reprinted last time mentioned a Bally return to consumer games - well, so far, they have licensed PacMan to Atari for their machine, and they have licensed Commodore to manufacture some games for the VIC-20.

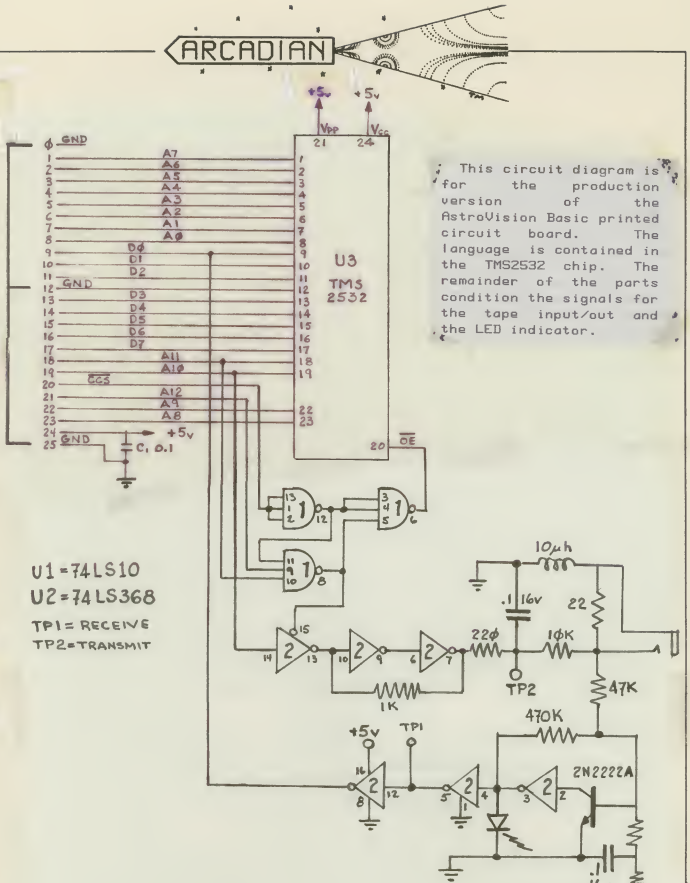
```
  1 . COLUMNS - D. MARTIN
  2 NT=0;FC=BC;GOTO 10
  3 IF Z=1Z=72
  4 IF Z=2Z=68
  5 IF Z=3Z=67
  6 IF Z=4Z=83
  7 RETURN
  8 BOX X-3,H,15,9,3;RETURN
  9 Z=(Z-1)%7;FOR Y=0TO 6;@(Q+Y)=@(Z+Y);NEXT Y;RETURN
 10 CLEAR ;PRINT "      C O L U M N S";PRINT "*** THE MAD PROGRAMMER ***
 12 CX=-59:FOR A=1TO 20;TV=42;NEXT A;PRINT
 15 CY=0;PRINT "    SHUFFLING CARDS...";@(0)=(RND (8)+1)%10+RND (4);FOR A=1TO 2
0
 20 @(A)=(RND (8)+1)%10+RND (4);FOR B=0TO A-1;IF @(B)=@(A)GOTO 20
 30 FC=FC+1;NEXT B;BC=BC+8;NEXT A;FC=84;BC=0;R=10
 40 FOR T=1TO 3;CLEAR ;CY=30;&(10)=0;FOR A=0TO 6;B=@(A)c10;C=RM;D=@(A+7)c10;E=R
M;F=@(A+14)c10;G=RM
 50 Z=C;GOSUB 3;C=Z;Z=E;GOSUB 3;E=Z;Z=G;GOSUB 3;G=Z;PRINT #7,B,D,F,;H=30-Ab10;X
=-35;CX=X;TV=C;GOSUB 8;X=7;CX=X;TV=E;GOSUB 8;X=49
 55 CX=X;TV=G;GOSUB 8;CX=-77;CY=CY-10;&(10)=37+Ab20;NEXT A;PRINT " WHICH COLUMN
",;IF T>1PRINT " NOW",
 57 PRINT " ?",;NT=9;&(10)=176
 60 L=KP-48;MU=L+48;IF (L>3)+(L<1)GOTO 60
 65 FOR Z=49TO 59;PRINT ;MU=Z;NEXT Z;NT=0;IF L=1M=2;N=3
 70 IF L=2M=3;N=1
 80 IF L=3M=2;N=1
 90 Z=N;Q=21;GOSUB 9;Z=L;Q=28;GOSUB 9;Z=M;Q=35;GOSUB 9;N=20;FOR Z=0TO 6;FOR Q=Z
TO Z+14STEP 7;N=N+1;@(Q)=@(N);NEXT Q;NEXT Z;NEXT T
100 CLEAR ;PRINT "     YOUR CARD WAS...";Q=@(R)c10;Z=RM;FOR A=16TO 23;&(A)=75;N
EXT A;GOSUB 3;X=0;R=Z
110 CY=8;FOR A=1TO RND (30)+10
115 CX=-5;B=RND (8)+1;Z=RND (4);GOSUB 3;PRINT #1,B,;TV=Z;NEXT A
120 CX=-5;H=8;PRINT #1,Q,;TV=R;GOSUB 8
130 FOR A=23TO 16STEP -1;&(A)=0;NEXT A
140 CY=-24;CX=-65;PRINT "WANT TO SEE IT AGAIN ?";IF KPRUN
>
```

COLUMNS is a computerized version of an old card trick. The computer will randomly select 21 cards (no face cards are used) and shuffle them. They are then laid out in 3 columns containing 7 cards each. You pick any card from the layout, then when the computer asks /WHICH COLUMN/ type in the column which contains your card (1-3 from left to right). The computer will then pick up the cards vertically, by column, and deal them out horizontally,which will rearrange the order. Tell the computer which column your card is in now. The computer will pick them up again vertically and lay them out horizontally, then ask you for the column once more. The computer will tell you the name of your card!

Examples of card names:

- 3C = 3 of clubs
- 5H = 5 of hearts
- 7S = 7 of spades
- 9D = 9 of diamonds

Dave Martin
3408 Braddock Street
Kettering, OH 45420



This circuit diagram is for the production version of the AstroVision Basic printed circuit board. The language is contained in the TMS2532 chip. The remainder of the parts condition the signals for the tape input/out and the LED indicator.

PC # BABS302P

MACHINE LANGUAGE MANAGER, a review...

We carried an ad for The Bit Fiddlers in the last issue, which offerred a new cartridge to be used in the Arcade. I ordered one, and quickly received a package containing the cartridge, a manual, and an overlay card. I asked Al Rathmell to review the product, and his report follows:

"The Machine Language Manager from the Bit Fiddlers is an EPROM plug-in software package for Z-80 machine language program development on the Bally Arcade.

"The user's manual is excellent. There are nine chapters that in a concise and easy-to-understand way, cover the concepts of machine language programming, use of the manager and its utility routines, and some good sample programs.

"The manual also includes a complete source listing of the Machine Language Manager, as well as the Z-80 instruction set in alphabetical order. The users manual is great, and one of the best features of the Machine Language Manager!

"Using the Manager is easy. After reading the users manual once, all that is required is an occasional glance at the quick reference command list on p. 8-1.

"The first obvious difference from using Bally Basic is the small character font. The small font allows up to 15 lines, and 39 characters per line. At first it looks a little strange, especially N and Q, but it is certainly readable and allows about twice as much information to be displayed than Basic. Punching in machine code is simple if you don't make mistakes. Fixing mistakes is a little tedious since the address is shown only every eight bytes. The insert and delete are somewhat difficult to use because you must keep track of the address of the last program opcode.

"The reset function is like the HALT command in Basic. Pushing RESET returns control to the manager without changing memory. Memory is only cleared during power-up.

"The Machine Language Manager is a useful tool for those into machine language programming. Some future additions that would make it better include a search function that would scan a memory range for a specified byte or string of bytes, and an assembly function that would generate opcodes from mnemonic source codes."

The above was written by one who uses machine code programming frequently, not a new-comer. I noted that the text contains some educational material, and some leading-by-the-hand, which is just what I need. As with most computer operations, one needs to "do it yourself" to better understand the operation, and I will be doing so in the future. You will be hearing more about the Machine Language Manager as we utilize this opportunity to study the computer in more detail.

A review of the manual that comes with the cartridge reveals a few interesting details. The first 37 pages contains a mixed bag of general descriptive material, some insights into the Basic language as written by the Bally software team, specific data about the Manager, and instructions as to its operation. There are a few sample programs.

A shift key is included, so that a couple of keys do double duty. These primarily are associated with the use of the tape port (300 baud, requiring the cassette interface), so that the equivalent of Basic commands :PRINT, *PRINT, :INPUT, and :LIST can be generated.

Following the above, the Bit Fiddlers have included the disassembled Manager program (28 pages), and the Z-80 OpCode in 15 pages.

ARCADIAN

Volume 4, Number 4 January 22,1982

CES IS OVER and I had an enjoyable but tiring four+ days. Also attending were: Andy Guevara of The Bit Fiddlers; Dick Houser of The Source Book; George Moses of George Moses Co.; John Perkins of Perkins Engineering; and Mike Toth & Marion Nalepa of Spectre Systems.

We all worked to help the AstroVision personnel show off the Arcade, the new game cartridges, and point out the features of the new Basic. We also met a number of subscribers and a few old acquaintances.

AstroVision had a good-sized booth, with 9 machines mounted on pedestals, each having a tv mounted above for good visibility, plus a giant tv console for really showing up the details of the game cartridges, and then two more tv's dedicated to the Add-Under. These were staffed by ZsuZsa Molnar and Frank Dietrich. Various AstroVision personnel and the distributors spent their time selling the product. For those visitors showing technical interest, we showed the Blue Ram, the Viper System 1 memory board, and the Bit Fiddler cartridge. We also had the Roger Saunders Edge Labels for display.

GAME STATUS will be indicated here, a more descriptive article will be presented next time.

Now available: Grand Prix, Galactic Invasion, Space Fortress, and Biorythm.

Coming up soon will be Pirate's Chase, MusicMaker, and The Wizard. After these will be Cosmic Raider and Coloring Book. There is a candidate for PacMan and it will be ready when some non-technical problems are ironed out.

Samples of everything except PacMan and Biorythm were shown. Two future candidates are Quest for the Orb, and SolarQuest.

THE ADD- UNDER units were very popular. While a number of programs were "canned", that is, they were on disc, both ZsuZsa and Frank made up little displays on the spot, and showed how the machine's ZGrass language could access the "macros" (large scale sub-routines) and show parts of pictures, reverse pictures, and rotated pictures. The most interesting item was a facial figure, made up of three subroutines - one for each eye and one for the mouth - each of which had a motion routine (each eye could be open, closed, look left, straight, or right, for example.) By some simple commands, the eye would then wink or look around. This was coupled to the Votrax sound synthesizer, so that the mouth movements followed the preprogrammed vocal phrases. While these units had two disc drives associated with each of them, the production units will not. The internals will be compatible with the addition of a disc operating system, which will be an optional accessory.

The current status of the Add-Under places it in the hands of the FCC next month for approval. Then production can get under way and deliveries should be in the 90-120 day region. If you are interested in the Add-Under, whose price is currently holding at the $600 level, let me know. There is a good possibility that we may have one of the samples on display at the West Coast Computer Faire, here in San Francisco, this March. More on that next time.

THIRD-PARTY SOFTWARE, that is, material developed by parties outside the AstroVision design and development organization, is in demand by everyone. If you are interested in writing software for the Arcade, of marketable quality, please contact me for details. Those who advertise in the ARCADIAN will be receiving a separate letter from me about this.

CONTEST ENTRIES THIS ISSUE are the programs* Cube, Pro-Bowl, and Alien.

©1982, Robert Fabris

BIT FIDDLER REVIEW - 2. In this issue we provide another review of the new cartridge by the Bit Fiddler, this time by Tom Wood.

Machine Language Monitor program

Ever wished for really fast graphics or control of the screen for full use of the 256 color capability? As I'm sure you guessed, these feats require the use of machine language (or perhaps the add-under when....) and machine language and BASIC just don't make a good couple. The Bally Arcade has long needed a well thought out monitor program; one that would permit a decent range of memory manipulation, cassette tape input/output, memory dump and program break-point facilities. This monitor would, preferably, be relatively inexpensive, utilize the game cassette connector and the built-in keypad. This would mean displacing BASIC, but since we have already committed to machine language, BASIC is of no further use.

Prayers are answered

The Bit Fiddlers have been listening and have recently introduced a very professional package which does all this and more. The Machine Language Monitor (MLM) is provided in its very own game-type cassette, complete with new keypad overlay and manual consisting of approximately 96 pages. Very unusual about this package is that 28 pages of this manual are the assembly listing for MLM itself. This listing is provided so that users may use any of the MLM routines instead of re-inventing the wheel.

Although I was able to use MLM for only a few hours, I was able to confirm that it performs to the manufacturers claims. It is also evident that it opens up a whole new set of sophisticated possibilities from other ARCADIANS who have already proven themselves to be an extremely resourceful lot. Using MLM, all of the Arcade facilities are available to your program including light-pen and screen interrupts, all 256 colors, direct control of the MAGIC register, full use of the 3-voice sound generator, the expansion port, game connectors etc.

About the only restriction I see is that the basic Arcade just doesn't contain much memory. MLM permits maximum use of the space that is available, allowing you to trade off viewable screen area for more program area. This feature provides 140 Hex (320 decimal) bytes and use of most of the screen, or more program bytes as you decrease viewable screen area. This space and use of MLM routines will permit reasonably sophisticated programs to be run, but as your desires and expertise increase, your need for additional memory will also increase. Luckily, MLM is compatible with any of the expansion facilities currently available.

The facilities provided by MLM are requested via the keypad layout illustrated here. In general, hex numbers are entered first followed by a key informing MLM what the hex data is to mean. Thus to enter address 123E hex, simply key in 1, 2, 3, E, ADDR. Since no more than 4 digits are being entered at once, MLM provides no backspacing or correction capabilities as such. Instead, just keep entering data until the last 4 (or 2) digits entered are correct. Complicated to explain, easy to use.

D	E	F	CALL
A	B	C	REG
7	8	9	LIST
4	5	6	INS
1	2	3	READ
*	0	WRITE	ADDR.

This monitor includes a feature that is both useful and dangerous, that of the INS key. With it data in memory is moved up to make room for new data (or, using *INS, moved down to delete extra data) thus saving a lot of keystrokes when inserting forgotten opcodes. One must remember, however, that internal program addresses will also change. This is no problem for relative jumps, but absolute jumps and calls can become disasters for the unwary.

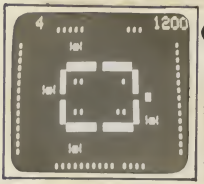
The asterisk (*) key serves as a "shift" key for certain command keys. Thus, *WRITE means output to tape, *READ is tape input, *INS is delete, *LIST is print and *REG is tape list without load.

I wish I had the room to go into further details about MLM, but that isn't possible here. If your appetite is whetted it is justified. Any "hacker" needs MLM. It is worth the investment and will permit you to enjoy the programs written using it in the future. Now, anyone working on an assembler???

A final word on this package. We will be supporting the use of machine language programs in the ARCADIAN, and solicit your inputs. Here is another way to increase your knowledge of computers in general and the Arcade specifically.

ASTRO- is now the official name for the various items - all new production hardware will have "Astro-" instead of the prior "Bally-" title.

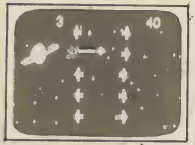
TWO NEW GAMES IN BALLY BASIC



Quadron

Prevent waves of monsters from breaking through your energy fortress.

Pilot your ship through two columns of missile-firing aliens



SPACE GAUNTLET

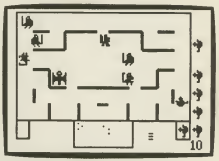
Both games on one cassette..$9.50

Order Tape #100

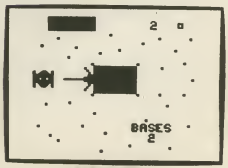
Please specify Bally or Astro. Basic

The tiny arcade
P.O. Box 1043
Cuyahoga Falls, OH. 44223

These sketches illustrate the screens of two of the new AstroVision games.



THE WIZARD



SPACE FORTRESS

ASTRO-BASIC MANUAL CORRECTION There is a direct typo in the progam "Artillery Duel" on page 95. In line 430, where BC is controlled, the printer dropped the initial "R" in the Random command, so change the printed portion to read BC=RND(3)*13+86 Then in line 190, when entering this line, be certain to leave a space after the IF statement. The printed line overflow to the next line has caused some confusion. This portion of the line should look like this:

```
IF W TV=95+(W>0)*2
```

SOME INTERESTING INFORMATION gleaned from the news releases presented by AstroVision management at the CES.

We have all complained about the lack of product, and the lack of advertising. These shortcomings are about to disappear - - -

Production capability is planned to triple this year. In addition to the existing facility in Garner, IA, the new plant in Sacramento, CA is expected to be on-line in February, and negotiations are underway for a third location in the Lancaster,PA area. With these plants up and running, plus other sub-contract locations, the capacity would be in excess of one-half million Arcades, 5 million cartridges, and 5c,ooo ZGrass units per year.

The Las Vegas area was saturated with a tv commercial during the 5 days of the show. Astrovision's advertising agency had made up a 30 second commercial showing some of the new cartridges, and this was shown 121 times - a full hour of time. This was the kickoff of the 1982 campaign, which will see an expenditure of $10 million dollars in tv advertising. This same commercial will now be sent to 50 major market areas, so keep an eye out for it.

GAME INSTRUCTIONS

The Cube: The diagram on the screen shows the cube 'unwrapped', with the front to the left. You must mix the puzzle up yourself - the computer acts only as a recorder of your moves. Moves are always made clockwise. Use the keypad to enter the moves. To rotate section 1 by one turn clockwise, you would input 11. The computer will then rearrange the cube to match your directions.

Cryptologic: This is a two-player game that can also be played by teams, rotating turns at guessing. When the screen asks, enter the number of letters in your word(s). (From 6 to 20) Spaces count as letters. While your opponents face the other way, enter your word(s) using the keypad. If you make an error, you must restart the game (press HALT, then WORDS RUN GO). After checking for errors, press GO. The entry will be erased, and then scrambled, using a random scrambling technique. The 'other side' must rearrange the letters/spaces into the proper relationship using a minimum number of moves.

Alien: The computer gives you 100 seconds of time to get a high score. The game stops at that time, or if you run out of bullets earlier. Hitting the Alien nets you 5 points, hitting the wall at the top of the screen yields 3 points. Once in a while there is a 'bonus' period when hitting the alien will increase your score by the bonus amount. When the screen buzzes, the Alien's spy satellite is whizzing by. A hit on it is worth 100 points, but it is very difficult. Use the joystick knob to move your gun laterally across the bottom of the screen, and the trigger to fire directly upward.

THE CUBE

```
 1 CLEAR ;BC=RND(32)b8;FC=BC+4+RND(32)b8;GOTO 20
 2 CX=X;CY=Y;PRINT #1,@(A),;A=A+1;Y=Y+B;RETURN
 3 FOR C=1TO B;M=@(P);@(P)=@(P+6);@(P+6)=@(P+8);@(P+8)=@(P+2);@(P+2)=M;M=@(P+1
);@(P+1)=@(P+3);@(P+3)=@(P+7)
 4 @(P+7)=@(P+5);@(P+5)=M;NEXT C;RETURN
 5 FOR C=1TO B;D=P;FOR Z=33+DTO 27+DSTEP -3;M=@(D);@(D)=@(Z);@(Z)=@(Z+18);@(Z+
18)=@(D+18);@(D+18)=M;D=D+3;NEXT Z;NEXT C;RETURN
 6 FOR C=1TO B;D=20;FOR Z=PTO P+2;M=@(Z);@(Z)=@(Z+9);@(Z+9)=@(Z+D+9);@(Z+D+9)=
@(Z+D);@(Z+D)=M;D=D-2;NEXT Z;NEXT C;RETURN
 8 FOR C=1TO B;D=16+Pc3;E=47+P;F=37+Pc3;FOR Z=PTO P+2;M=@(Z);@(Z)=@(D);@(D)=@(
E);@(E)=@(F);@(F)=M
 9 D=D-3;E=E-1;F=F+3;NEXT Z;NEXT C;RETURN
 20 Y=0;A=-7;FOR X=-78TO 65STEP 13;BOX X,Y,1,42,1;Y=Y+A;IF (Y=-21)+(Y=21)A=Ab(-
1)
 30 NEXT X;LINE -78,21,0;LINE -39,42,1;LINE 0,21,1;LINE -52,35,0;LINE -13,14,1;
LINE -65,28,0;LINE -26,7,1;LINE -78,21,0;LINE -39,0,1;LINE 39,42,1
 40 LINE 78,21,1;LINE -78,7,0;LINE -39,-14,1;LINE 39,28,1;LINE 78,7,1;LINE -78,
-7,0;LINE -39,-28,1;LINE 39,14,1;LINE 78,-7,1;LINE -78,-21,0
 50 LINE -39,-42,1;LINE 39,0,1;LINE 78,-21,1;LINE -65,14,0;LINE -26,35,1;LINE -
52,7,0;LINE -13,28,1;LINE 13,-28,0;LINE 52,-7,1;LINE 26,-35,0
 60 LINE 65,-14,1;LINE 13,-14,0;LINE 52,-35,1;LINE 26,-7,0;LINE 65,-28,1;LINE 7
8,-21,0;LINE 39,-42,1;LINE 0,-21,1
 70 A=1;FOR Z=0TO 5;FOR B=Zb9+1TO Zb9+9;@(B)=A;NEXT B;A=A+1;NEXT Z
 80 A=1;Y=21;B=7;FOR X=-64TO -38STEP 13;GOSUB 2;NEXT X;Y=14;FOR X=-51TO -25STEP
 13;GOSUB 2
 90 NEXT X;Y=7;FOR X=-38TO -12STEP 13;GOSUB 2;NEXT X;Y=11;B=-7;FOR X=-71TO -45S
TEP 13;GOSUB 2
 100 NEXT X;Y=-3;FOR X=-71TO -45STEP 13;GOSUB 2;NEXT X;Y=-17;FOR X=-71TO -45STEP
 13
 110 GOSUB 2;NEXT X;Y=-3;B=7;FOR X=-32TO -5STEP 13;GOSUB 2;NEXT X;Y=-17
 120 FOR X=-32TO -5STEP 13;GOSUB 2;NEXT X;Y=-31;FOR X=-32TO -5STEP 13;GOSUB 2;NE
XT X
 130 Y=18;FOR X=8TO 34STEP 13;GOSUB 2;NEXT X;Y=5;FOR X=8TO 34STEP 13;GOSUB 2;NEX
T X
 140 Y=-8;FOR X=8TO 34STEP 13;GOSUB 2;NEXT X;Y=32;B=-7;FOR X=46TO 72STEP 13;GOSU
B 2;NEXT X
 150 Y=18;FOR X=46TO 72STEP 13;GOSUB 2;NEXT X;Y=4;FOR X=46TO 72STEP 13;GOSUB 2;N
EXT X
 160 Y=-21;B=7;FOR X=14TO 40STEP 13;GOSUB 2;NEXT X;Y=-28;FOR X=27TO 53STEP 13;GO
SUB 2;NEXT X;Y=-35;FOR X=40TO 66STEP 13;GOSUB 2;NEXT X
 170 CX=-5;CY=40;A=KP-48;TV=A+48;B=KP-48;TV=B+48;GOSUB Ab1000;GOTO 80
1000 P=10;GOSUB 3;P=1;GOSUB 5;RETURN
2000 P=2;GOSUB 5;RETURN
3000 P=37;GOSUB 3;P=3;GOSUB 5;RETURN
4000 P=19;GOSUB 3;P=7;GOSUB 8;RETURN
5000 P=4;GOSUB 8;RETURN
6000 P=28;GOSUB 3;P=1;GOSUB 8;RETURN
7000 P=1;GOSUB 3;P=10;GOSUB 6;RETURN
8000 P=13;GOSUB 6;RETURN
9000 P=46;GOSUB 3;P=16;GOSUB 6;RETURN
```

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```
 1 CLEAR                                    PRO BOWL
 4 BC=147;GOTO 11
 5 CX=-45;CY=-30;W=RND (5);RETURN
 6 CX=-65;CY=-5;RETURN
 7 W=RND (3);RETURN
 8 W=RND (2);RETURN
 9 G=0;Y=0;RETURN
11 A=0;N=0;Y=0;Q=1;M=15;S=0;F=1;G=1;H=10;X=-30
20 BOX 0,-30,120,20,1;BOX 0,-30,100,18,2
21 D=-40;FOR E=1TO 9;BOX D,-38,1,3,1;D=D+10;NEXT E;GOSUB 40;GOSUB 60;GOTO 100
30 G=G+1;IF G=5IF H-Y>0G=1;F=3-F;H=10
31 H=H-Y;IF (H<1)+(G=1)H=10;G=1
32 S=S-(RND (20)+10);IF S<10M=M-1;S=60-RND (10);IF M<2IF (Q=2)+(Q=4)BC=106
33 IF M<0Q=Q+1;M=15;S=0;IF Q=3X=30;Y=0;F=2;G=1;H=10;BC=147;GOSUB 60
34 IF Q=5Q=4;M=0;S=0;GOSUB 40;STOP
40 CY=40;CX=-77;PRINT " AFC        TIME       NFC
45 PRINT #3,A,#9,M,":",#0,S,#9,N
47 PRINT ;PRINT "DOWN",#2,G,"      QUARTER",#2,Q
48 IF G=1IF F=1IF X>39GOTO 51
49 IF G=1IF F=2IF X<-39GOTO 51
50 GOTO 54
51 H=50-ABS(X)
54 PRINT "YDS TO GO",#4,H
55 CX=0;CY=-15;IF F=1PRINT "a";GOTO 57
56 PRINT "_
57 RETURN
60 BOX 0,-30,100,10,2;IF F=1X=X+Y;IF X>49X=50
61 IF F=1GOTO 63
62 X=X-(Y);IF X<-49X=-51
63 BOX X,-30,1,1,1
70 IF F=1IF X>49A=A+7;X=30;GOSUB 9;F=2;GOSUB 80
71 IF F=1IF X<-49N=N+2;X=0;GOSUB 9;F=2;GOSUB 85
72 IF F=2IF X<-49N=N+7;X=-30;GOSUB 9;F=1;GOSUB 80
73 IF F=2IF X>49A=A+2;X=0;GOSUB 9;F=1;GOSUB 85
74 BOX X,-30,1,1,1;RETURN
80 GOSUB 5;PRINT "TOUCHDOWN";GOTO 89
85 GOSUB 5;PRINT "SAFETY
89 BOX 0,-30,100,10,2;RETURN
100 GOSUB 6;PRINT "INPUT OFF.
105 O=0
110 IF JY(1)=10=1
120 IF JY(1)=-10=2
130 IF JX(1)=10=3
140 IF JX(1)=-10=4
150 IF TR(1)O=5
160 IF O>0GOTO 200
170 GOTO 100
200 GOSUB 6;INPUT "INPUT DEF."P
210 IF (O=1)+(O=2)GOTO 700
215 IF RND (20)=17GOSUB 5;PRINT "FUMBLE";GOSUB 355;GOTO 690
220 GOSUB 5;GOSUB 10b0+300;GOTO 690
310 Y=RND (5);IF P=1Y=Y-RND (3)
311 IF P=5IF W=3Y=0
312 IF P=5IF W#3Y=Y+3
313 RETURN
```

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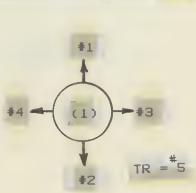
```
320 Y=RND (7);IF P=2Y=Y-RND (5)
321 IF P=5IF W=3Y=-2
322 IF P=5IF W#3Y=Y+5
323 RETURN
330 GOSUB 7;IF W=1GOTO 750
331 IF P=3GOSUB 8;IF W=1GOTO 750
332 Y=RND (9);GOTO 800
333 GOSUB 5;IF P=5IF W=3GOTO 900
334 IF P=5IF W#3Y=Y+5
335 RETURN
340 GOSUB 7;IF W=1GOTO 750
341 IF P=4GOSUB 8;IF W=1GOTO 750
342 Y=RND (15)+5;GOTO 800
343 GOSUB 5;IF P=5IF W=3GOTO 900
344 IF P=5IF W#3Y=Y+9
345 RETURN
350 Y=RND (20)+30;IF P=5IF RND (10)=2GOTO 730
351 IF F=1IF X+Y>49GOSUB 760;A=A+3;X=30;GOTO 355
352 IF F=2IF X-(Y)<-49GOSUB 760;N=N+3;X=-30;GOTO 355
353 IF F=1X=X+Y;GOTO 355
354 X=X-(Y)
355 GOSUB 9;F=3-F
356 RETURN
690 GOSUB 60;GOSUB 30;GOTO 100
700 IF RND (20)=15Y=RND (30)+10;GOSUB 5;PRINT "BREAKAWAY";GOTO 690
710 GOTO 220
730 GOSUB 5;PRINT "BLOCKED";GOTO 355
750 GOSUB 5;PRINT "INCOMPLETE";Y=0;RETURN
760 GOSUB 5;PRINT "FG";RETURN
800 W=RND (10);IF W=7CX=-45;CY=-30;PRINT "INTERCEPTED
810 IF W=7G=0;F=3-F;RETURN
830 IF O=3GOTO 333
840 GOTO 343
900 GOSUB 5;PRINT "Q-TRAP";Y=-RND (15)
910 RETURN
```

Pro-Bowl: Use the chart below to enter your plays - the Offense uses Joystick (1) for its inputs (see the sketch), while the Defense uses the keypad. The arrow on he screen indicates ball direction. The game includes fumbles, touchdowns, field goals, safeties, and a two minute warning. Breakaways are possible on running plays, and incompletes and interceptions possible on passing plays.

PLAYS		
OFFENSIVE	choice	DEFENSIVE
OFF TACKLE	- 1 -	OFF TACKLE
END RUN	- 2 -	END RUN
SHORT PASS	- 3 -	SHORT PASS
LONG PASS	- 4 -	LONG PASS
KICK	- 5 -	BLITZ



```
        ALIEN
   1 &(9)=165;&(0)=0;&(1)=0;&(2)=99;&(3)=99;I=20;L=510
   2 O=0;T=101;&(I)=0;X=RND (35);CLEAR ;FOR A=-78TO -28STEP 2;BOX A,-42,1,4,1;NE
XT A;B=-80
   3 K=0;U=0;S=-55
   4 BOX 27,40,106,3,1
  10 CY=39;PRINT " SCORE `";PRINT Q;CY=11;PRINT " SECONDS";CY=-37;PRINT " BULLET
S
  20 X=RND (99)-I;Y=RND (I);FC=10
  30 BC=7;BOX 27,-2,106,84,2;GOSUB 350;IF (T=20)+(T<11)NT=1;MU="Q";NT=0;IF T=0GO
TO 400
  40 X=X+RND (10)-5;IF X>76X=76
  50 Y=Y+RND (7)-3;IF Y<-32Y=9
  51 IF UGOSUB 600
  60 IF Y>34Y=34
  70 IF X<-20X=0
  80 CX=X-1;CY=Y;TV=102;K=KN(1)c3+22;BOX K,-39,3,10,1;BOX K,-42,7,4,3;IF TR(1)=0
GOTO 30
  90 IF UIF K=SGOTO 700
 100 B=B+2;N=1;R=76;O=0;BOX B,-42,1,4,2;IF K>X-5IF K<X+4N=12;GOSUB 300
 180 BOX K,O,1,R,3;NT=1;FOR A=1TO N;MU=I;BC=AbK;NEXT A;BC=7;IF B=-28GOTO 400
 181 IF @(6)=1GOTO 190
 182 IF PX(K,40)BOX K,40,3,6,2;Q=Q+3;CX=-90;CY=31;NT=0;PRINT Q
 190 @(6)=0;GOTO I+(RND (I))1)b10
 300 O=(Y-40)c2;R=Y+40;Q=Q+W+5;CY=31;CX=-90;NT=0;@(6)=1;PRINT Q;RETURN
 350 CX=-90;CY=3;T=T-1;NT=0;PRINT T;W=0;IF RND (9)=9W=RND (5)b10;NT=1
 355 IF U=0IF RND (50)=5U=1;NT=1;FOR A=1TO I;MU="B";NEXT A;NT=0
 360 IF W CY=-9;CX=-66;PRINT " BONUSa",W
 370 RETURN
 400 H=0;CLEAR ;IF Q>ZGOSUB 550
 401 CY=39;PRINT " -GAME OVER-",;IF T=0PRINT "(TIME EXP.)";GOTO 405
 402 PRINT "(AMMO GONE)
 405 &(I)=99;M=M+Q;P=P+1;IF M>30000M=0;P=0
 410 PRINT " AVG. SCORE TODAYa",#1,McP;NT=9;PRINT " YOUR POINTSa",Q;GOTO 500+Hb1
0
 500 IF Q>C V=J;J=G;G=C;C=Q;GOTO L
 502 IF Q>G V=J;J=G;G=Q;GOTO L
 503 IF Q>J V=J;J=Q;GOTO L
 504 IF Q>V V=Q
 510 NT=1;PRINT ' "TOP 5" SCORES OF TODAY';CY=CY-4
 511 PRINT " #1 ",;FOR D=1TO F;TV=@(D);NEXT D;PRINT Z
 512 BOX -8,3,144,9,3;CY=CY-4;PRINT " SECOND",C
 515 PRINT " THIRD ",G;PRINT " FOURTH",J;PRINT " FIFTH ",V
 520 IF TR(1)GOTO 2
 525 NT=1;MU=Q
 530 GOTO 520
 550 V=J;J=G;G=C;C=Z;Z=Q;CY=30;PRINT " BEST SCORE! ENTER UP TO   5 SYMBOLS (FOR
I.D.)
 560 INPUT " # OF LETTERS?"F;IF F>5GOTO 560
 580 FOR D=1TO F;E=KP;TV=E;@(D)=E;NEXT D;CLEAR ;H=1;GOTO 401
 600 S=S+4;IF S>80S=-55;U=0
 610 BOX S,0,1,1,1;RETURN
 700 W=0;Q=Q+95;GOSUB 300;S=-55;U=0;BOX K,-20,1,40,3;NT=1;FOR A=1TO I;MU=A;BC=Ab
8;NEXT A;NT=0;GOTO 30
```

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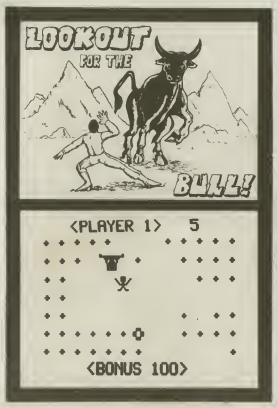

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```
  1 .<CRYPT-O-GRAMS>
  2 .ADAPTED FOR THE
  3 .BALLY ARCADE BY
  4 .KEN SPRINGSTEEN
  5 CLEAR ;&(10)=180;M=RND (2)
  9 BC=135;FC=40
 10 BOX 0,0,94,10,1;CY=0;CX=-42;PRINT "<CRYPT-O-GRAMS>",
 15 FOR Q=1TO 950;NEXT Q
 45 NT=1
 60 CLEAR ;Z=0;V=0;A=0;B=0;D=0;E=0;W=0
 75 CY=0;PRINT " NUMBER OF LETTERS?        (INCLUDING SPACES)
 90 INPUT " FROM 6 TO 20 LETTERS ONLY"K;CLEAR ;CX=-60
 95 IF (K<6)+(K>20)CLEAR ;GOTO 75
100 CY=35;CX=-42;PRINT "<CRYPT-O-GRAMS>";CX=-60
105 CY=0;Z=Z+1;TV="-";IF Z=KGOTO 135
120 GOTO 105
130 NT=3
135 CY=0;CX=-60;FOR A=1TO K;@(A)=KP;IF &(23)=16MU="Q"
140 TV=@(A);NEXT A
150 PRINT ;PRINT ;CX=-60
155 NT=0;CY=-20;CX=-60;PRINT 'PRESS "GO" TO SCRAMBLE';IF &(23)#1GOTO 155
157 CY=-20;CX=-60;PRINT "←          22 spaces          →"
165 CY=0;NT=10;PRINT "←          23 spaces          →";NT=1
180 CX=-60
200 IF M=2GOSUB 375
210 IF M=1GOSUB 435
285 NT=5;A=B-K;@(B)=KP;IF &(23)=16MU="Q"
295 TV=@(B);IF @(B)#@(A)GOTO 330
300 IF B=Kb2GOTO 345
315 NEXT B;GOTO 285
330 NT=0;D=CX;E=CY;CY=18;CX=-15;PRINT "WRONG!";NT=20;&(20)=100;MU="?";MU=";";FO
R W=1TO 700;NEXT W
331 CY=18;CX=-15;NT=0;&(20)=0;PRINT "       ";CX=D-6;CY=E;PRINT " ",
332 CX=D-6;CY=E;V=V+1;NT=3;GOTO 285
345 NT=2;CX=-60;CY=20;PRINT "YOU GUESSED IT WITH";CX=-60;CY=11;PRINT #0,V," EXT
RA GUESSES!"
349 FOR A=256TO 125STEP -2;&(16)=100;&(17)=A-2;&(18)=A+2;&(19)=250;&(22)=255;NE
XT A
350 &(16)=0;&(17)=0;&(18)=0;&(19)=0;&(22)=0
355 CY=-31;NT=5;&(10)=142;PRINT "20506070605060700050050000";FOR W=1TO 500;NEX
T W;NT=3
365 RUN
375 FOR A=5TO KSTEP 5;TV=@(A);NEXT A
385 FOR A=2TO KSTEP 5;TV=@(A);NEXT A
395 FOR A=4TO KSTEP 5;TV=@(A);NEXT A
405 FOR A=3TO KSTEP 5;TV=@(A);NEXT A
415 FOR A=1TO KSTEP 5;TV=@(A);NEXT A
425 RETURN
435 FOR A=3TO KSTEP 5;TV=@(A);NEXT A
445 FOR A=4TO KSTEP 5;TV=@(A);NEXT A
455 FOR A=1TO KSTEP 5;TV=@(A);NEXT A
465 FOR A=5TO KSTEP 5;TV=@(A);NEXT A
475 FOR A=2TO KSTEP 5;TV=@(A);NEXT A
485 RETURN
500 :PRINT ;NT=1;PRINT "CY=39";CY=39
510 :PRINT ;LIST 1,13;GOSUB 550;LIST 100,13;GOSUB 550;LIST 285,8;GOSUB 550;LIST
349,9;GOSUB 550;LIST 425,7;PRINT "CLEAR ;RUN
540 GOTO 540
550 PRINT "CY=39";CY=39;RETURN
```

Ken Springsteen
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ALTERNATIVE ENGINEERING REPORTS that all Viper 1 units which have been paid for have been shipped. It has taken a while, but they are now 'ahead of the game', and they can deliver from stock. The keyboard will be ready soon - I have an evaluation unit here, and can say that the quality of this unit is equal to the Viper itself. An eight-foot retractile cord connects it to the Viper 1, making it quite convenient to place in your lap while operating. More later on it. If you have questions or would like a copy of their brochure, call or write Alternative Engineering Inc., P O Box 128, Gardiner, ME 04345 (207) 582-6327

(In this photo, the arcade unit is sitting on top of the new Viper 1 box, while the keyboard is in front. The Viper box is resting on some unseen supports - the keyboard is only 9" deep.)

TRADE: I HAVE EXCESS #5002 CARTRIDGES AVAILABLE FOR TRADE, (POKER/ACEY DEUCEY/BLACK JACK). I NEED #2005 STAR BATTLE, #2010 DOGPATCH, #2011 GALACTIC INVASION, #2014 GRAND PRIX, AND THE DEALER DEMO CARTRIDGE. WRITE BEFORE SHIPPING TO: JAMES E. NOLL, P.O.BOX 16392, IRVINE, CA 92713

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USER GROUP INTEREST? in the San Antonio area, Contact W. Fidone, 8288 Eckert #5, San Antonio 78240. In the Quad Cities Iowa area, contact Ken Springsteen, 1935 Winding Hill Rd., #1008, Davenport, 52807

Robert Fabris, weary
3626 Morrie Drive
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Volume 4, Number 6 ARCADIAN April 9, 1982

WHAT'S NEW? Well, nothing definate, but there are rumors around. These are cropping up: The Add-Under has lost its voice but gained 64K of memory, and a new title - ZGRASS 100; The Arcade unit will now be called the ASTROCADE; The pacman derivative will be out the first of July; And that there will be aVideocade of John Perkins' ARTILLERY DUEL, with all the graphics, color, and sound available in a cartridge, plus a little humor.

GREMLINS TO THE LEFT OF US... Yes, there were a couple of errors in the last issue.

FUDD will not work with the new AstroBasic. There is a discussion under "DIFFERENCES", below.

page 46- The first of the Poke'd values should read 1779 instead of 1799.

page 52/53- line 960 should read 1000, and change the HOHO segment of line 8002 to read

HOOHOHHOONOLLOHHOFHOOO

In addition, Ken Springsteen suggests the following changes to his program on page 42:

add a new line 270 PRINT; PRINT; CX=-60; FOR B=K+1 TO Kc2

change line 510 to read:

:PRINT; LIST 1,13; GOSUB 550; LIST 100,14; GOSUB 550; LIST 285,8; GOSUB 550; LIST 349,9; GOSUB 550; LIST 425,7; PRINT "CLEAR; RUN

to load the program to tape (in Bally Basic), key in GOTO 500 start the recorder (RECORD), and press GO

DIFFERENCES between the old and new Basic Videocades: We are somewhat at a disadvantage by being outside the company because what we know of the Basic, beside that which is written in the small manuals, is primarily discovered material. That is, noone tells us all about the secrets, or tricks, or capabilities, and one or another of us has to find these out through research or luck. We were fortunate in receiving an unofficial set of brief notes that discusses these differences, much as the Bally Basic Hacker's Guide.

● The old Basic has a $ command which accesses the calculator routine resident in the on-board ROM. With this command, one could perform arithmetical calculations with 6 places either side of the decimal point. Not a very popular command, it was removed to make way for some of the useful features of the new system. Programs written using the $ command are not convertible for use with the new Basic. Unfortunately, this leaves out a couple of clever programs.

● :Return will not be understood by the new system, but it can usually just be forgotten from a program. It's purpose was to close off the tape input port.

● &(16) through &(23) commands controlled the variables of the noise system. These have been replaced as follows: old commands - &(16), &(17), &(18), &(19), &(20), &(21), &(22), &(23) are replaced by MO, TA, TB, TC, VD, VC, VR.VF, VA,VB, NM,NV commands, respectively. If your Bally Basic program contains the &( ) notation, set NT=-1 to disable the sound, and experiment.

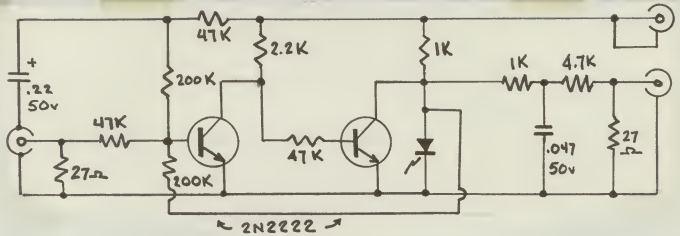
● SM series are commands only in AstroBasic, having to do with where/how screen printing appears. The old Basic has the equivalent of SM=0. SM is used for effect, and its elimination would not ruin a program (usually).

● Machine code problems which is the case of FUDD. Machine code is inserted into memory spaces ("poke'd") using the %( ) command. The location of this memory space is the Line Input Buffer, which now occupies a different location in the memory map, from 20180 - 20283 in the old Basic, to 20154 -20257 in the new Basic.

● *( ) is a new string system that is only available in the AstroBasic. A program with both string systems is not convertible to Bally Basic, one with only the *( ) might convert.

©1982 R.FABRIS

TAPE DUPLICATION 2 Perkins Engineering sent this circuit which is to be used between two inexpensive recorders for the duplication of tapes. The LED should be a 'bright' one, such as a suggested RShack 276-033, and if you can measure the transistors, the one with the lower gain is at the left.



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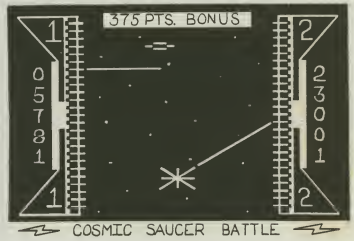

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TAPE DUPLICATION 3 Wavemakers is making custom duplication available. The cost is $1.50 per cassette (C-12), including cost of the cassette, with a 50 piece minimum order. Contact them at 312- 893- 4192.

GOLDFISH is a program that was developed by Andy Guevara by the use of his Machine Language Monitor program. He displayed it to us at the Faire and it is a cute demonstration piece. A fishtank appears, a number of fish swim back and forth - continuous motion, no jerks - and a little pussy cat looks longingly. A clock is included, and every minute, the cat meows. Andy has the listings for $3., and a tape that can be loaded into either Basic (:RUN), or the MLM cartridge, at $5. Check the address in their full page ad.

ELECTRONIC GAMES, May issue (released March 15!) has numerous mentions of Bally/Astrovision. The magazine is primarily directed towards company-produced games, either for full-size arcade units, or for home game units such as Atari,etc. A two-page article includes an interview with Bob Ogdon, programmer for Dave Nutting Associates, outlining some of the games he produced. An interesting magazine if you want the 'big picture' of the game universe.

SCHEDULE FOR PUBLICATION- for the remainder of the year is currently planned as follows: The last day for me to receive material to be included in the next issue is essentially the last Friday of the month, specifically: April 23, May 28, Jun 25, Jul 23, Aug 27, Sep 24. The issue should then be in the mails the following Friday. The cutoff date for any programs submitted for the co ntest is the Friday prior to ones identified above. If anyone plans on a full- or half-page ad, I'd like to know about it early, so as to block out the space. Your continued cooperation in sending in programs and text material will help me keep pumping the paper out for our mutual enjoyment and learning.

VIDEOCADES AT CLOSE-OUT PRICES: these are left-overs from the West Coast Computer Faire, and I'd rather not be in the mail order business. Galactic Invasion, Bally Pin, Space Fortress, Astro Battle - at $26.each including shipping. New Basic at $46. including shipping. We also have a real 'deal' on the old Basic at $21. including shipping. These prices are good until April 30.

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These Three Programs will change, insert or delete a character or command word in a Bally Basic Program. Please include a stamped self-addressed envelope. (904) 492-1470

```
  6          S=0;A=400;B=700;C=0;X=0;Y=0;U=0;V=0;G=5;I=0;H=300;CLEAR ;BC=0;FC=1
17;J=32;M=44
  9 FOR W=0TO 3;GOSUB 150+W;NEXT W;GOSUB 800;GOSUB 705
 20 FOR N=1TO 4;GOSUB H+N;@(N)=K;@(N+4)=L;GOSUB A;NEXT N;BOX X,Y,4,4,2
 30 FOR N=1TO 5;IF ABS(X)<24IF ABS(Y)<20GOTO 38
 34 FOR N=1TO 4;IF ABS(X-@(N))<8IF ABS(Y-@(N+4))<5IF PX(@(N),@(N+4))GOSUB 780;G
OSUB H+N;@(N)=K;@(N+4)=L;GOTO 40
 36 NEXT N;GOTO 39
 38 IF ABS(X)<20IF ABS(Y)<12GOTO 120
 39 IF (ABS(X))28)+(ABS(Y))20)GOTO 56
 40 FOR P=-1TO 1STEP 2;IF PX(X+3bP,Y)GOTO 500
 42 NEXT P;X=X+JX(1)bR
 44 FOR P=-1TO 1STEP 2;IF PX(X,Y+3bP)GOTO 550
 46 NEXT P;Y=Y+JY(1)bR;GOTO 62
 56 IF PX(X,Y)=0MU=59;MU=61;C=2;S=S+1;GOSUB 800;I=I+1;IF I=60GOSUB 110;S=S+8;GO
SUB 800;M=M-1;J=J-1;I=1;FOR D=1TO 3;GOSUB 150+D;NEXT D
 57 IF J=27 J=28;M=40
 58 X=X+JX(1)bR;Y=Y+JY(1)bR
 59 IF ABS(X)>52 X=-X+(Rb(ABS(X)cX))
 60 IF ABS(Y))36 Y=-Y+(Rb(ABS(Y)cY))
 62 BOX U,V,4,4,C;BOX X,Y,4,4,3;C=3;U=X;V=Y;MU=52;E=E-1;IF E=16BC=88
 72 IF E=0R=2
 75 NEXT W
 80 FOR N=1TO 4;K=@(N);L=@(N+4);BOX K,L,8,4,2;GOTO 200+Nb2
 90 @(N)=K;@(N+4)=L;NEXT N;GOTO 30
110 BC=0;R=4;E=48
112 NT=9;FOR Z=1TO 2;MU=68;MU=76;MU=68;MU=73;NEXT Z;FOR Z=1TO 2;MU=68;MU=75;MU=
68;MU=72;NEXT Z;MU=68;MU=73;NT=3;RETURN
120 IF PX(X,Y)=0C=2;GOSUB 110
125 GOTO 58
150 FOR Z=-1TO 1STEP 2;BOX 24bZ,0,4,28,1;BOX 0,16bZ,44,4,1;BOX 24bZ,0,4,4,2;BOX
0,16bZ,4,4,2;NEXT Z;RETURN
151 FOR Z=-1TO 1STEP 2;BOX 16bZ,0,2,18,1;BOX 16bZ,0,2,14,2;BOX 12bZ,0,2,18,1;BO
X 12bZ,0,2,14,2;NEXT Z;RETURN
152 FOR Z=-52TO 52STEP 104;FOR T=-28TO 28STEP 4;BOX Z,T,2,2,1;NEXT T;NEXT Z;RET
URN
153 FOR Z=-36TO 36STEP 72;FOR T=-28TO 28STEP 4;BOX T,Z,2,2,1;NEXT T;NEXT Z;RETU
RN
202 L=L-1;GOSUB A;IF L=16GOSUB B;GOSUB H+N
203 GOTO 90
204 L=L+1;GOSUB A;IF L=-16GOSUB B;GOSUB H+N
205 GOTO 90
206 K=K-1;GOSUB A;IF K=26GOSUB B;GOSUB H+N
207 GOTO 90
208 K=K+1;GOSUB A;IF K=-26GOSUB B;GOSUB H+N
209 GOTO 90
301 K=(RND (4)-3)b11+5;L=J-RND (3);RETURN
302 K=(RND (4)-3)b11+5;L=-J+RND (3);RETURN
303 K=M-RND (3);L=(RND (4)-3)b8+4;RETURN
304 K=-M+RND (3);L=(RND (4)-3)b8+4;RETURN
400 BOX K,L-1,8,1,1;BOX K+3,L,1,4,3;BOX K-4,L,1,4,3;BOX K,L-1,4,3,3;RETURN
500 IF JX(1)=-P X=X+JX(1)bR
510 GOTO 44
550 IF JY(1)=-P Y=Y+JY(1)bR
560 GOTO 62
700 BOX K,L,8,4,2;FOR Z=1TO 8;FC=8;MU=56;MU=52;FC=117;NEXT Z;GOSUB 150
705 G=G-1;CX=-40;CY=40;PRINT #1,G;IF G=0GOSUB 110;FOR Z=1TO 8;NEXT Z;CX=-24;CY=
```

STAR SIEGE
Tom McConnell
3858 Kenwood Dr.
Stow OH 44224

A Space Invader type game, where your laser cannon is moved by the KNob, and the TRigger fires the laser beam. The mother ship has six aliens craft that drop bombs, while the mother ship also has a few. Shields can protect against these bombs until they are depleted. Available shield units are displayed on the U/L screen area.

```
0;NT=0;PRINT "GAME OVER";NT=26;MU=61;NT=0;IF KPRUN
 710 RETURN
 780 BOX @(N),@(N+4),8,4,2;S=S+2;C=2;GOSUB 150;FOR Z=1TO 4;MU=64;MU=61;NEXT Z
 800 NT=0;CX=40;CY=40;PRINT #1,S,#1,"00";NT=3;RETURN
```

CARTRIDGE SWAPPING - 2: continuing Dave Ibach's scheme with some explanation -

o The routine is "relocatable", meaning that if you already have something residing in location 19900, you can change the address.

o Once the routine has been entered, do not allow scrolling, or it will be destroyed.

o For a shorter delay loop,(about 10 sec.) change 8480 to 8464.

o Only the program and other occupants of the screen are (string variables) are preserved. Contents of the variables (A, B, etc., and RM, FC, etc., are unpredictable. SZ Will be correct, however

o If you want to erase the routine after the swap, POKE in values of zero, as: FOR N=19900 TO 19915; %(N)=0; NEXT N

This is the machine language routine, with comments:

```
F3            DI          ; disable interrupts
06  20        LD   B,32   ; time-wasting loop
21  00  00    LD   HL,0
23            INC  HL
CB  7C        BIT  7,H
28  FB        JR   Z,-5
10  F6        DJNZ   -10

C3  03  25    JP   2503H  ; branch to new cartridge
   or
C3  61  24    JP   2461H  ; branch to old cartridge
```


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SOFTWARE

TOP 5 TODAY by Steve Walters

This program keeps track of the 5 best scores of the day, and displays them with 3 initials selected by the player making one of the 5 best scores, just like in the commercial arcade games. It can be added to any game which involves competition for best score.

The first listing uses the keypad to minimize memory space requirements. It uses 311 bytes for the program, plus 40 bytes for the string variable, for a total of 351 bytes.

```
970 Z=0; PRINT "YOUR SCORE=",S; PRINT;
    PRINT "TOP 5 TODAY:"; PRINT; FOR
    N=0 TO 19; Q=Nd4; IF Z=1 GOTO 974
972 IF RM=0 IF S>@(N+3) GOSUB 984
974 IF RM#3 TV=@(N)
976 IF RM=3 PRINT @(N)
978 NEXT N
980 IF TR(1)GOTO NNN (next game cycle)
982 GOTO 980
984 FOR Q=19 TO N+4 STEP-1; @(Q)=
    @(Q-4); NEXT Q; @(N+3)=S; Z=1
986 CY=-40; PRINT "YOUR CODE:s",;
    FOR Q=0 TO 2; L=KP; TV=L; @(N+Q)=L;
    NEXT Q; PRINT "sY=OKsN=NO",; L=KP;
    GOSUB 998; IF L#89 GOTO 986
988 CY=8-Nm2; RETURN
998 BOX 0,-40,160,7,2; CX=-80; RETURN
```

Note: the letter O is not used as a variable; d=divided by; s=a space; m=multiplied by

If you have memory space for 393 bytes (+40 for the string), the following modification (from Line 986 on) will allow the initials to be selected by the hand control:

```
986 CY=-40; PRINT "CODE:s",; FOR Q=0
    TO 2; L=64
987 L=L+JY(1); IF L<64 L=90
988 IF L>90 L=64
990 TV=L; IF TR(1) IF L#64 @(N+Q)=L;
    NEXT Q; GOTO 994
992 CX=CX-6; GOTO 987
994 PRINT "sTR=OKsJY=NO",
995 IF JY(1) GOSUB 998; GOTO 986
996 IF TR(1) GOSUB 998; CY=8-Nm2;
    RETURN
997 GOTO 995 (one more line)
998 BOX 0,-40,160,7,2; CX=-80; RETURN
```

This program can be modified for New Astrovision Basic to use less memory: For the keypad version, in Line 986 change GOSUB 998; to PRINT; and eliminate Line 998.

For the hand control version, in Line 995 and 996 change GOSUB 998; to PRINT; and eliminate Line 998.

You must set SM=2 for these, and you may want to change string @ to string *.

The New Astro Basic uses 282 bytes for the keypad version and 361 bytes for the hand control version, plus 40 bytes for the string in either case.

If you want to see TOP 5 TODAY run by itself, add Line 10 and revise Line 980:

```
10 CY=-40; INPUT "NEXT SCORE="S; CLEAR
980 GOTO 10
```

Then run it. Input a score, vary the letters with JY and select them with TR.

* * * * *

The following must be considered in making TOP 5 TODAY compatible with your program:

(1) the program uses @(0) thru @(19) to store the scores and initials; these should all be at zero when the program is loaded each time.
(2) variables L, N, Q and Z are used but do not retain permanent values from one game cycle to the next.
(3) variable S is used for the current player's score from the last game.
(4) variable RM is calculated in Line 982.
(5) TR(1) and JY(1) result in hand control No. 1 always being functional; if you want to use 2 or more hand controls, you will have to change these to the player-number variable.
(6) in the New Astro Basic versions, SM=2 is required.

software by...

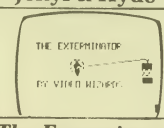
VIDEO WIZARDS

#1 **Jekyl & Hyde**

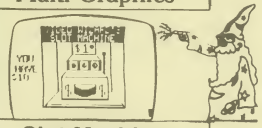
#1 **Jekyl & Hyde**

#2 **Multi-Graphics**

#3 **Crypt-O-Grams**

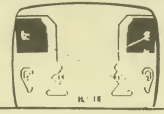


#4 ***The Exterminator***

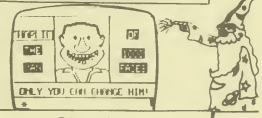


#5 **Slot Machine**

#6 *Lazer Brains*



#6 *Lazer Brains*



#7 **Charlie**

#8 **Arcade**

#9 **Hot Rod Customizing**

#10 **Space Creatures**

#11 **Susie**

#12 **Home Sweet Home**

#13 **Puppy-Vision**

The programs pictured above are now available from VIDEO WIZARDS. All programs (#1-#6) are $5 each. The G.P.'s (graphic pictures), indicated by an asterisk, are $1 each. When you "RUN" the G.P. programs the computer will prompt you to input BOX dimensions & modes. By moving the boxes with the joystick & freezing them with the trigger you can customize your own picture in your own creative way! Then you can save your picture on any blank tape! Minimum order per tape is $10.

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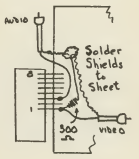
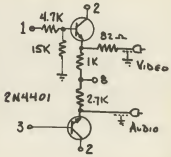
All programs are in Astro-Basic only!

COLOR MONITOR CIRCUIT - $0.10: We provided a circuit in Volume One which allowed the Arcade to be connected directly to a TV monitor (bypassing the rf link). It was only good for black and white. We thought... With some clues from John Perkins and a little experimentation with 100 ohm resistors, the following simple circuit developed. The Video signal is taken from the video output line and ground, and a 300 ohm resistor shunted across as well. The rf modulator must remain connected, as the signal appears, after conversion, on the input side as well as the output side. This circuit works very well with my NEC monitor (purchased for my Apple, but now...) YOUR monitor may require a bufferring circuit, and an effective one is shown:





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Machine Language Manager

What it is:

Many of today's peronal computers, and in fact many business computers, have inside them the same microprocessor as the Astrovision (Bally) Arcade--the Z-80. This is a powerful microprocessor, capable of much more than simple games and other programs presently written for the Arcade. The Machine Language Manager is a cartridge designed to take advantage of the Z-80's power by allowing the user to program the Z-80 directly in its own native language.

What it does:

The MLM allows greater control of graphics and input/output functions than Basic does by using Z-80 machine language. Using machine code, greater program sophistication can be achieved. This means programs like word processors, business programs, device controllers, and multi-colored high speed graphics.

How it works:

The Machine Language Manager works with the Arcade's keypad in much the same way that Basic does, but rather than entering Basic statements, the user now enters his program in Z-80 Hexadecimal code. By using the MLM, the user can create, edit, list, run, or store his machine language program on cassette tape at the push of a button.

Why machine code:

The primary difference between Basic and machine code lies in the instruction set. Where Basic is a "high level language", Z-80 machine code is the most rudimentary (nitty-gritty) level of programming. This means a far greater number of instructions are available for use, giving the user more flexibility. For example, all the Bally game cartridges, and even Basic itself, are written in Z-80 machine language.

What you need to work with it:

A working knowledge of Z-80 machine language (or not being afraid to learn it), will suffice. This information can be found in almost any bookstore or computer store. To work with a cassette tape deck, you will need the old Bally Basic 300 baud interface (unfortunately no longer in production).

What it will work with:

The MLM will work with anyone's memory extension and any and all external hardware you may want to hang on the Arcade.

What we provide:

The Machine Language Manager comes with its own keypad overlay, and a 96 page manual. The manual is written in tutorial fashion, and once completed should only be needed for occasional reference.

How much:

The Machine Language Manager retails for $54.95. We pay the postage. If you're in California, you get to pay the tax.

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For Sale, Arcade with four controllers, Bally Basic plus interface, Computer Ear, Blue Ram,Videocades, all Arcadian and Cursor volumes, others, all in excellent condition. $750 value, best offer over $475. Garry Hallquist, Box 610, 625 Pennsylvania St. Denver, CO 80203

Ballycheck to test operation of the motherboard - built/tested unit $80. plus $2.50 shipping. Program burnt into EPROM $20. plus 1.50 shipping. Bally system repairs: $30. labor charge,+$5.50 to ship back to you,+ cost of parts needed. All parts stocked for the units. Contact Dick Belton, RGB Electronics 4906 Willshire Ave. Baltimore.MD 21206 or call 301-488-2806

ARCADIAN

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ARCADIAN

Volume 4 Number 7 May 7, 1982

FORMAT CHANGES are in the works. Actually, we are getting too many ads, and they are starting to crowd out the editorial material. Starting next month, the largest ad accepted is 1/2 page, and we will shift the text areas to this two-column format.

BIT FIDDLER MOD if you haven't received an update describing the use of the 2000 baud system, drop them a line.

ADD-UNDER INTEREST remains high and we are accumulating a list of people seriously interested in the machine. I plan to send out a sort of Bulletin to those on the list as soon as there is definate word as to availability, etc., so if you want to be included in the 'first wave', and will have the cash to back it up, drop me a line.

TAPE LOADING DISCUSSION As a result of a number of questions from the newer subscribers, and the discovery of an anomaly, here are a few words regarding the loading of pre-packaged program from tape into the computer.

If you have a program on a tape, the following step-by-step procedure should result in a good load. The presentation is of a column of instructions for each of the units - the computer, the cassette deck, and the screen picture. Do these in order:

A. To load computer from tape.

COMPUTER	CASSETTE DECK	SCREEN
Cable from Basic Cartridge to "EARPHONE"		
1. RESET		>■
(Blue)]: (Words) INPUT GO		?:INPUT
	PLAY	?:INPUT
	At beginning of loading, words on screen will slowly disappear, from top to bottom.	
	At end of loading, cursor reappears	>■
	STOP	

RUN GO

To load next program, start at Step 1.

PRINTING I am still looking for a scheme to be able to print from the 2000 baud cartridge. The current method uses the old Bally Basic, the Cassette Interface, and an internal tap therein to extract a TTL level signal. Those with a printer needing a 12-volt signal can utilize a booster circuit printed in Vol. 1, P. 47, or a new one-piece system using an LC1488 chip. We'll have a circuit next issue.

STAR SIEGE ERRATA Well, I really got that one twisted. While the instructions are for Star Siege, the program is for QUADRON. The proper instructions follow:

QUADRON
(One Player)

This game challenges you to defend a four-walled energy fortress by pursuing and eliminating four monsters who are slowly impinging on the walls and intent on breaking through.

If a monster breaks completely through a wall (i.e. creates a "hole" or space the width of a wall) the fortress is destroyed. You start the game with a complement of four fortresses. The game ends when all four have been destroyed.

To eliminate a monster, you must move the joystick-controlled blip (it is in the center of the fortress when the game begins) toward the monster and "touch" it with the blip. The monster will then disappear. However, another will take its place on the same side of the wall at a distant starting point.

You will have a limited supply of energy with which to pursue the enemy. When you are running low on energy, the background color of the playfield will turn red as a warning.

This means you will soon have to return the fortress and eat one of the energy dots located inside. (to eat a dot move the blip over the dot) Otherwise, your speed will be cut in half and it will be very difficult to keep up with the monsters.

Eventually, you will eat up the eight energy dots. To gain a new supply of these, it is necessary to eat all sixty of the bonus dots located near the four edges of the playfield. (You will also receive sixty new bonus dots) When you accomplish this, the challenge will increase as the four monsters' starting points will move slightly closer to the fortress.

In summary, then, the game action consists of eliminating monsters to protect the fortress and eating dots to ensure your energy supply.

There are three basic routes you can follow in moving about the playfield.

1. Moving around the outside perimeter of the walls.
2. Passing through the inside of the fortress via the four openings in the walls.
3. Moving off one side of the playfield and appearing on the opposite side.

Use these alone and in combination to pursue monsters and eat dots.

SCORING

Monster..... .....200 points
Bonus Dot..... .....100 points
All Sixty Bonus Dots Eaten..... .....800 points

HAND CONTROL

Joystick.....Move the stick in the direction you wish to move the blip
Trigger.....No Function
Knob.....No Function

The number of fortresses you have remaining is displayed in the upper left-hand part of the screen, while the current score is shown in the upper right-hand corner.

To start a new game, press any key (except "H"

Robert Fabris 1982

TAPE LOADING PROBLEM We have noticed a random problem in loading programs from a tape into the machine.

o The screen starts to load "garbage" at the top, five or six lines of it, then the cursor reappears.

o A "fix" is to immediately stop the tape, reenter the :INPUT command (and GO), and PLAY the tape. The program should start loading immediately.

I don't know what the real problem is; it appears that the leading edge of the first leader tone sometimes sets the computer into thinking data is coming in, for about two seconds (when the cursor reappears). Since there is still about one second of leader tone, it is possible for the computer to catch the end of this tone and make a good load.

We are now loading our tapes with the volume control at zero, and as soon as the leader tone appears, we turn the volume control to the normal level. The leader then appears gradually to the computer, and we have not had a re-occurance of this problem. All tapes using this gradual scheme are coded with a green dot under the "baud rate" notation on the tape.

BLUE RAM EXPANSION BREAKTHROUGH!!

Perkins Engineering announces a New 16K BLUE RAM and a modified 8K Extended Basic Cartridge, with three UPDATE choices for 4K Blue Ram owners. Their tentative schedule is:

During May and June they offer to:

Expand your 4K Blue Ram to 16K for $135.95 and replace your BR extended Basic Cartridge at no extra charge!!

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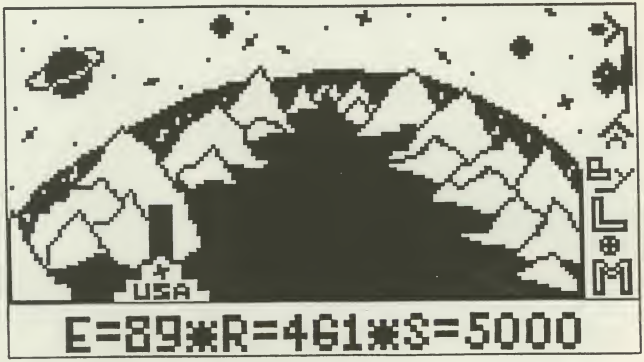
Sell you a set of plans for $5.

On or about July 1 they will begin shipping a NEW 16K BLUE RAM with printed circuit boards and a flexible link to the Arcade. Kit price $199.95, or assembled and tested $249.95

All other Blue Ram products and prices are unchanged at this time.

Cassette #14 $15.95
Alien Invasion and
Alien Invasion II

3 DIMENSION



Star Fleet Command has put you at the controls of a pulse-pounding photon cannon. Your orders are to stop the invasion of aliens war machines. It takes a cool head and a steady hand. Only you stand in their way. Can Earth be saved or will the aliens destroy your cannon and invade Earth?

Normally, a picture this detailed in 3-dimension would require more memory than is available in the Arcade program section. We have utilized a special Arcade feature called mass screen memory. There is almost 4K of memory available in this way. The game operation is contained in the 1.8K program memory section. By using both in a unique way this game, with expanded graphics, is possible. It is equivalent to about 5K of memory.

This is probably the best use of the Arcade graphics to date and the largest most detailed play field yet developed for Basic.

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DEALER INQUIRY INVITED!!

IV-7

5-7-82

BALLY BASIC ONLY

```
  3 . FROG
  4 . BY BOB WISEMAN
  5 GOTO 99
 10 D=D+1;IF D>QGOTO 60
 20 T=T+1;IF T>RGOTO 80
 30 CALLB;BOX -75,0,4,40,2;IF TR(1)=0GOTO 10
 40 &(22)=96;BOX -44,-22,3,5,3;Z=KN(1)&8+28;LINE X+Z,Y+Z,3;IF PX(X+Z,Y+Z)GOTO 5
 50 S=S+6;LINE X+Z-7,Y+Z-7,3;BOX X+Z,Y+Z,13,13,2;BOX X+Z-7,Y+Z-7,1,1,3
 55 S=S-1;CX=I;PRINT S,;&(22)=3;LINE X,Y,3;BOX -44,-22,3,5,3;GOTO 10
 60 %(A)=256bRND (25)+6544;CALLE;D=0;Q=5+RND (7);GOTO 20
 80 S=1;T=0;IF TR(1)=0GOTO 80
 84 D=0;BOX 0,1,160,30,2;GOTO 40
 99 Q=10;R=255;CLEAR
500 C=20200;E=C;A=C+3;S=800
505 D=-43;GOSUB S
510 D=53;GOSUB S
515 D=10240;GOSUB S
520 D=20210;GOSUB S
525 D=-13871;GOSUB S
530 D=-1936;GOSUB S
535 D=-32690;GOSUB S
540 D=12288;GOSUB S
545 D=2432;GOSUB S
550 D=527;GOSUB S
555 D=-247;GOSUB S
560 D=78;GOSUB S
565 D=0;GOSUB S
570 D=30;GOSUB S
575 D=30;GOSUB S
580 D=56;GOSUB S
585 D=503;GOSUB S
590 D=255;GOSUB S
595 D=231;GOSUB S
600 D=32;GOSUB S
605 D=24;GOSUB S
610 D=0;GOSUB S
615 B=C;D=-43;GOSUB S
620 D=8231;GOSUB S
625 D=10307;GOSUB S
630 D=40;GOSUB S
635 D=17185;GOSUB S
640 D=-13871;GOSUB S
690 CLEAR ;X=-36;Y=-27;LINE X,Y,2
700 BOX -52,-31,33,25,1
705 BOX -59,-21,23,5,2
710 BOX -38,-21,5,5,2
715 BOX -44,-22,5,5,2
720 BOX -37,-37,5,13,2
725 BOX -44,-23,3,3,1
730 BOX -37,-27,3,1,2
735 BOX -42,-42,1,3,2
740 BOX -44,-42,1,3,2
745 BOX -47,-37,3,11,2
750 BOX -52,-38,7,1,2
755 BOX -48,-40,5,6,2
760 BOX -52,-42,3,1,2
765 BOX -52,-40,3,1,2
770 CY=32;CX=-50;BOX 0,32,120,16,3;BOX 0,32,118,14,3;PRINT "SCORE ",;I=CX
780 NT=1;&(21)=48;&(23)=32
785 &(22)=3;&(17)=230;&(16)=100
790 &(18)=100;GOTO 80
800 %(C)=D;C=C+2;RETURN
```

FROG

The frog sits in the lower left corner, waiting for the flies to come by. Use the KNob to control the length of the tongue, and the TRigger to zap the fly. Watch out, misses count against you. This program works in Bally Basic only (BB), and must be saved on tape right after you load it - before you RUN it - as some of the 'insides' get destroyed while running.

Bob Wiseman
118 St. Andrews Dr.
Cincinnati, OH 45245

<CRYPT-O-GRAMS> Correction #2
The new line, 270, as added on p.55 should be corrected to show Kb2 at the very end - that is, multiply.

NEW LOCAL DEALER in the San Jose area is Sights and Sounds, at 1556 South Saratoga/Sunnyvale Rd., 95129. They plan to carry all third party products as well as the factory offerrings for the Arcade. And call them about space for a local user group meeting - contact Stan Sult.

WAVEMAKERS
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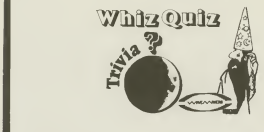

TAPE ‹1›

WHIZ QUIZ--TRIVIA. THIS IS THE FIRST PROGRAM OF IT'S KIND. IT'S NOT LIMITED BY THE AMOUNT OF MEMORY IN THE BALLY, SINCE ALL THE QUESTIONS ARE FED FROM THE TAPE TO THE COMPUTER. (OVER 250 TOTAL QUESTIONS) THESE ARE ALL MULTIPLE CHOICE QUESTIONS AND THE ANSWERS ARE SELECTED WITH THE HAND CONTROL. THE COMPUTER KEEPS TRACK OF RIGHT AND WRONG ANSWERS. WE'VE GIVEN YOU A BIG VARIETY OF QUESTIONS RANGING FROM ASTROLOGY TO TV TRIVIA. THEY MAY NOT SEPARATE THE DUMMYS FROM THE EINSTEINS BUT THEY SHOULD GIVE YOU A GOOD IDEA WHO KNOWS, WHAT'S WHAT,WHO'S WHO, HOW MANY, WHEN WAS, AND WHO CARES ANYWAY!!! FOR ALL THOSE WHO LOVE TRIVIA, DON'T MISS WAVEMAKERS TAPE II WHIZ QUIZ.

SUPER SOFTWARE
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PRESENTS:

Tape 12
DEFENSE FORCE

By Robert Rosenhouse

You are the defender of your planet's energy supply. A nonviolent group of aliens in desperate need of energy sources is invading your space sector for your limited supply of fuel. These endless hordes of invaders relentlessly attempt to appropriate your supplies for their own uses. But beware, for as time passes, increasing numbers of invaders appear. Do your best to belay the onslaught of marauders.

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Are you interested in learning machine programming? Know some BASIC? Want to do it easily on the Bally? Z-80 minicourse (45pgs.) starts from the basics and takes you thru soft techniques used with the custom chips. Analogies to BASIC instructions throughout. Experiments, charts, diagrams, explanations, and full machine code documentation on the programs included. Useful time saving utilities for machine programming. Programs include: Color Scribble and Record-Draw and record full color creations. * Color Tunnel and Art-See over 100 movig colors. * Color formatter-Spruce up ypur existing programs with this add on. * Machine programming utility * American Flag * Logo * P.S.-- You don't have to know anything about programming to use and enjoy the programs--All that is required is Old Bally Basic-- --Sorry, not compatible with Astro Basic.-- PRICE $12.00 (Bound manual and C-20 Agfa tape w/programs.) Barry Ellerson * 5017 W. River Rd. * Schiller Pk., Ill. 60176

```
 2 .
 3 . NIGHT RAID
 4 . BY PAUL SLEZAK
 5 T=0;N=3;O=5;K=0;P=0;F=0;H=1;G=38
10 BC=0;NT=3
20 CLEAR ;GOSUB 900;CLEAR ;NT=0;&(22)=180
30 X=75;Y=G;Z=70
40 GOSUB 700;GOSUB 780
50 GOSUB 800
60 B=BbH;X=X-B;Z=Z-B
80 IF K=5GOTO 100
90 K=RND (10);IF K#5GOTO 110
95 Q=X;R=Y
100 R=R-RND (10);GOSUB 600
110 IF KN(1)#DGOSUB 800
120 IF P=1GOSUB 500;GOTO 140
130 IF TR(1)=1GOSUB 500;P=1
140 GOTO 40
400 FOR I=1TO 15
410 GOSUB 790
420 BC=90;BC=82;BC=0
430 NEXT I;GOSUB 792;P=0;O=O-1;IF O<1GOTO 1000
440 X=RND (2);IF X=2GOTO 460
450 X=75;Z=70;H=1;GOTO 470
460 X=-70;Z=-75;H=-1
470 G=G-7;IF G<-30GOTO 1100
480 Y=G;GOTO 40
500 IF P=1GOTO 520
510 S=D;T=-32;FOR I=1TO 5;&(23)=255;&(21)=255;NEXT I;&(23)=0;&(21)=0
520 BOX S,T,1,3,1;BOX S,T,1,3,3
530 IF Y<=TIF Z<=SIF S<=XGOTO 400
540 T=T+15;IF T>Y+8P=0
550 RETURN
600 &(16)=50;IF RND (50)=30Q=D
605 IF R>-36RETURN
610 &(16)=255;IF Q<=D+10IF D-10<=QGOTO 630
620 K=0;RETURN
630 FOR I=1TO 12;GOSUB 790
640 BC=5;BC=10;BC=11;BC=14;BC=0;NEXT I
650 GOSUB 792;P=0;K=0;N=N-1;IF N=0GOTO 950
660 RETURN
700 BOX X,Y,1,1,1
710 BOX Z,Y,1,1,1
720 BOX X,Y,1,1,3
730 BOX Z,Y,1,1,3
740 Y=G;Y=Y-(RND (7)-1)
750 B=RND (8);IF H=1IF Z<-75GOTO 440
760 IF H=-1IF Z>75GOTO 440
770 RETURN
780 &(16)=255;&(17)=255;&(18)=255;RETURN
790 &(20)=205;&(23)=250;&(21)=80;&(18)=100;&(22)=255;RETURN
792 &(18)=255;&(23)=0;&(21)=0;&(20)=0;&(22)=180;RETURN
800 IF F#0BOX D,-40,3,3,3;BOX D,-36,1,3,3
810 D=KN(1);F=1;IF D>75D=75
820 IF D<-75D=-75
830 BOX D,-40,3,3,1;BOX D,-36,1,3,1;RETURN
900 FOR C=1TO 3;FC=5;CLEAR ;CY=0;CX=-55
910 PRINT "N I G H T   R A I D"
```

EITHER ASTROBASIC or BALLY BASIC

NIGHT RAID A squadron of 5 bombers has been sent to destroy us at night. We have 3 bases as defense. Only 1 bomber strikes at a time, but it has the ability to locate the base. You will be able to see the lights of the aircraft as it moves overhead, but not the bombs it drops. Another objective of the bomber is to land. If it does so, destroy the base. Blue flashes indicate a bomb hit, red flashes indicate a destroyed bomber. Use KNob to move base, hold TRigger down to launch anti-aircraft missile.

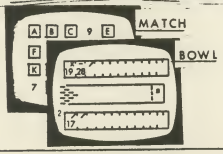
Paul Slezak
1104 S. Neltnor
West Chicago, IL 60185

As of 3 May, the name of the manufacturer of the Arcade and Videocades is ASTROCADE inc.

Also, the Bally name is being deleted from all printed matter.

```
 930 FOR E=1TO 25;NEXT E
 940 NEXT C;FC=84;RETURN
 950 FC=5;CLEAR
 960 PRINT " OH,WONDERFUL
 970 PRINT "     NOW WHAT !!!!!!!
 980 PRINT "WE'VE GOT NO DEFENSE LEFT";CY=0;GOTO 1120
1000 CLEAR ;PRINT "YOU HAVED SAVED US !!!!
1005 CY=0
1010 PRINT "YOU EVEN LEFT US WITH ",#1,N;PRINT "BASES
1020 GOSUB 792;NT=1;STOP
1100 NT=1;CLEAR ;CY=0
1110 PRINT "THE BOMBER HAS LANDED"
1120 PRINT "PREPARE TO DETONATE T.N.T.
1499 FOR A=1TO 3000;NEXT A;CLEAR
1500 BOX 0,-15,30,30,1;Y=5;Z=20
1510 FOR I=1TO 10;BOX 0,Y,2,30,1
1520 BOX 0,Z,10,2,1
1525 BOX 0,Z,10,2,3
1530 Z=Z-2;Y=Y-2;NEXT I
1540 BOX 0,-15,30,30,3
1550 FOR I=30TO 160STEP 5
1560 GOSUB 790
1570 FC=5;BC=84;FC=10;BC=90;FC=11
1571 BC=93;FC=14;BC=95;FC=85;BC=0
1580 BOX 0,0,I,Ic2,1;NEXT I
1585 BC=85;NT=0;CY=0;CX=-30;PRINT "GAME OVER
1590 FC=0;NT=1;GOSUB 792;&(22)=0
```


Buying software ?



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INSTRUCTIONS EITHER ASTROBASIC or BALLY BASIC

Stranded On Rigel 5: In this program you are stranded on Rigel 5. After you have typed in the program and all other values (see Caution) run the program. The landscape of Rigel 5 will appear and a strange noise will occur. Press any key. The computer will respond with a question mark. This is the skill level (1--easy, 2--advanced, 3--suicidal). When the computer asks you to input the code, press 5 different digits. The computer will respond with something like this: 3-2. This means that 3 numbers appear in the code and 2 numbers are in the right place. You have 8 tries at this code. This is a sample run to break the code (say the code is 62371 for example):

INPUT	CODE	
12345	3-2	(3 means numbers in the code. 2 means
12367	5-2	numbers in the right place.)
62317	5-3	
62371	5-5	

After you input the right code your ship will appear. Press any key. You will then fight the "Rigelian" ships. You need to have a quick trigger finger since the ships will appear constantly. By the way, you only have 5 tries to escape.

After you have typed in the program input the following:

@(0)=-43	@(10)=-247	@(20)=1792	@(30)=0	@(40)=8128
@(1)=19253	@(11)=14414	@(21)=16128	@(31)=1102	@(41)=32512
@(2)=10240	@(12)=-512	@(22)=13024	@(32)=1024	@(42)=-21824
@(3)=20210	@(13)=-512	@(23)=16224	@(33)=1024	@(43)=32672
@(4)=-13871	@(14)=-17920	@(24)=5600	@(34)=3584	@(44)=8128
@(5)=-1936	@(15)=14336	@(25)=5952	@(35)=7936	@(45)=3584
@(6)=-32434	@(16)=31744	@(26)=14912	@(36)=7936	@(46)=32512
@(7)=12288	@(17)=27648	@(27)=736	@(37)=7936	@(47)=25792
@(8)=2432	@(18)=-14848	@(28)=1792	@(38)=15104	@(48)=-3648
@(9)=527	@(19)=0	@(29)=0	@(39)=31616	@(49)=224
				@(50)=0

To record the program, type the following:

```
B=%(20050)+102  (GO)
A=-24576  (GO)
:PRINT; CLEAR; PRINT "A=",A,";B=",B,";FOR N=A TO B;%(N)=KP;
NEXT N; %(20050)=B-102; :RETURN; RUN"; FOR N=A TO B; CY=40;
TV=%(N); NEXT N; :RETURN  (Start recorder and press GO)
```

CAUTION! Make sure the entire program is correct.

If you stop the program while it is running, you will have to retype the values of @(0) to @(10) because they are wiped out when the program is run.

Have Fun!

$100 Prizewinner!

STRANDED AT RIGEL is a two-part game, where you have to determine the code that the machine generates, and having successfully passed that test, you have the villains to contend with. If this portion becomes too difficult, one should be able to bypass this area by a GOTO 500 command.

```
  6 W=20200;Y=W+13;R=W+3;F=-40;BC=0;FC=126;CLEAR ;FOR A=-80TO 80;LINE A,-40,0;F
=F+RND (3)-2;IF F<-40F=-40
  7 LINE A,F,1;IF A>50BOX RND (160)-80,RND (70)-40,1,1,1
 10 NEXT A;PRINT "   STRANDED ON RIGEL 5";P=0;FOR A=17TO 20;&(A)=7;NEXT A;&(16)
=92;&(22)=-1;IF KPINPUT S
 80 GOSUB 900;O=0;K=20;GOSUB 749+(P>0)
100 CLEAR ;BOX -50,32,60,1,1;BOX -42,-5,1,74,1;P=0;BOX 0,0,3,87,1;BOX -5,0,10,2
,1;%(Y)=128;%(R)=8774
105 CALLW;FOR A=0TO 4
110 @(A)=RND (10)-1;FOR Q=0TO A-1;IF A=0NEXT A
111 IF @(A)=@(Q)GOTO 110
120 NEXT Q;NEXT A;PRINT "INPUT CODE";PRINT
124 FOR P=1TO 8;FOR A=5TO 9
125 @(A)=KP-48;IF (@(A)<0)+(@(A)>9)GOTO 125
126 TV=@(A)+48;NEXT A;C=0;D=0;FOR A=0TO 4;IF @(A)=@(A+5)C=C+1
140 FOR Q=5TO 9;IF @(A)=@(Q)D=D+1
143 NEXT Q;NEXT A;CX=-36;PRINT #0,D,"-",#0,C;IF C=5GOTO 180
161 FOR A=17TO 20:&(A)=-1;NEXT A;&(16)=33;&(22)=Pb31;NEXT P
170 %(Y)=129;%(R)=67;CALLW:N=9
172 FOR A=32TO NSTEP -5;&(18)=-A;BOX -7,A,2,5,3;BOX -7,A,2,5,3;NEXT A;BOX -7,N,
7,2,2;N=N-2;IF N>2GOTO 172
175 GOSUB 700;GOTO 190
180 BOX 0,6,3,10,2;BOX 16,0,35,1,1;BOX 40,-30,50,5,1:BOX 40,-13,30,30,1;BOX 40,
4,20,5,1;BOX 40,14,5,16,1;BOX 40,-30,5,5,2
190 GOSUB 900;CX=12;CY=40;PRINT "CODE WAS:";CX=21;FOR A=0TO 4;PRINT #0,@(A),;NE
XT A;IF KPIF P=9GOTO 100
500 K=0;GOSUB 750
510 CLEAR ;E=0;FOR A=1TO 30;BOX RND (160)-80,RND (88)-44,1,1,1;NEXT A;FOR T=1TO
3;GOSUB 600;NEXT T;V=80;H=V
520 FOR N=1TO RND (8-S)b14;H=H+JX(1)b4;%(R)=20480+H;CALLW;IF TR(1)&(22)=-1;GOSU
B 580
530 CALLW;NEXT N;FOR A=48-Tb10TO 40STEP 10;FOR B=-74TO 80STEP 16;IF PX(B,A)GOSU
B 600;T=T+1;GOTO 520
540 NEXT B;T=T-1;NEXT A;CALLW:GOTO 800
580 FOR A=-32TO 40STEP 10;BOX H-74,A,2,5,3;BOX H-74,A,2,5,3
581 &(18)=A;IF PX(H-74,A)BOX H-75,A+1,11,9,2;&(21)=-1;&(23)=9;GOSUB 900;RETURN

590 NEXT A;E=E+1:RETURN
600 %(Y)=129;FOR A=0TO 9;%(R)=2560bT+Ab16;CALLW;NEXT A;%(Y)=128;IF T#8RETURN
610 FOR A=1TO 40;MU=3;NEXT A;GOSUB 700;GOTO 510
700 FOR Z=1TO 7;&(21)=-1;&(18)=99;&(19)=99;&(16)=1;&(23)=9;BC=7-Z;NEXT Z;GOSUB
900;O=O+1;IF O<5RETURN
710 CLEAR ;PRINT "YOUR 5 LIVES ARE GONE";PRINT "YOU HAVE FAILED!";IF KPGOTO 80
749 FOR A=0TO 10;C=W+Ab2;%(C)=@(A);NEXT A
750 C=Y+7;FOR A=31-KTO 50-K;C=C+2;%(C)=@(A);NEXT A;RETURN
800 FOR A=16TO 19;&(A)=60;NEXT A;&(21)=89;&(22)=-1;&(23)=61;FOR A=1TO 15;PRINT
;NEXT A;GOSUB 900;PRINT "GREAT!
810 PRINT "EFFICIENCY IS",100-Ob9-P-E+Sb3,"%";IF KPGOTO 80
900 FOR Z=16TO 23;&(Z)=0;NEXT Z;RETURN
```

Sean Walsh
7060 S. Marshall St.
Littleton, CO 80123

5-7-82

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GOLDFISH DEMO!

Actually they're Neon Tetras, but that would make the name too long. This demo tape is designed to show the power of the Machine Language Manager cartridge. It's a relatively short program, but it independently controls the actions of 7 goldfish, a digital clock, and the meowing of the cat. And it's in 4 colors.

Animation is smooth, and non-blinking. And GOLDFISH does not require MLM to run. The program will run with Bally Basic, Astrovision Basic, and MLM.

An interesting sidelight: Once loaded and running, GOLDFISH no longer needs a cartridge in the slot. You can remove it and the program will keep running until you hit RESET.

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We are now able to store and retrieve MLM programs reliably using the Astrovision Basic cartridge. So now, you have the option of using either the old 300 Baud cassette interface, or the new Astrovision Basic cartridge. Quite a breakthrough, we think!

I have an extra Space Fortress cartridge, in the box in perfect condition. I would like to trade this for any Bally road race game. Call 217-789-2102, between 8:30 AM and 5 PM, and ask for Steve or Janeene to arrange trade.

Will pay $50 to $100 cash for broken Bally Arcades - send your phone number or ship unit to: R. O'Meara 3178 Arizona Way, Marcellus, NY 13108 315-673-2359

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PERKINS ENGINEERING has been contracted by Astrocade to finalize the AddUnder. John Perkins, of Artillery Duel and Blue Ram fame, will put the finishing touches to the printed circuit board design that is the basis for the AddUnder wiring, in order to incorporate all the specifications finally agreed upon. (And included in the 6-page item sent to all who asked for it, with SAE); and to make the board more amenable to manufacture.

Up to now, the basic wiring of the AddUnder has been created by hand for each unit, using such techniques as wire-wrap. And each unit has had different capabilities - witness all the different specifications. Now the wiring schematic can be reduced to a printed circuit board design, taking into account the manufacturing process of 'board stuffing' that must take place. For example, like parts should be grouped together, so that the machine operator can install them quickly. It is better to have all 470 ohm resistors for example, right next to each other, than have them scattered over the board. Remember, we are not talking about a board being packed by hand, but an assembly line where 15-20 boards per hour go through each station.

AUTHORS/SUBJECTS WANTED We want to increase the amount of textual material included in the ARCADIAN as well as the program material. We would therefore like to build up a cadre of technical writers who could be called upon to handle various subject areas. But not only do we need authors, we need subjects as well. Drop us a line on what you would like to see explained, or an area where clarification is needed, etc.; or if you would be willing to share your expertise. A question/answer segment might be the way to start this off, so lets hear from you.

SPECTRE'S MISSILE COMMAND, a program developed to utilize the improved hand controllers marketed by Spectre, is in the process of being converted into a game cartridge, so that you will be able to plug it into the game slot. Contact them at 14430 Barclay, Dearborn MI 48126 for info.

LOS ANGELES OWNERS INVITED to an Open House and general meeting in July for all Astrocade enthusiasts in the Los Angeles area. Call or write:
Mark Krivulka
HOME ARCADE ELECTRONICS
3742 Maxson Rd
El Monte 91732 (213) 443-4189

LINE NUMBERS There are two ways to command the Arcade to perform an operation; the "executive mode" whereby the command you type in will be done immediately upon pressing GO , and the more normal delayed method where you accumulate a batch of commands and the machine performs them in an orderly manner when you type RUN . The orderliness is created by the "LINE NUMBER" scheme.

Each command is given a line number, from 1 on up. The line number is typed first, then the command or other statement. As long as you do not press GO the material on the screen can be modified in any way. When GO is pressed, the line number and statement are stored in memory for future use. Line numbers don't have to start with 1 , most programs start with "10". You don't have to enter them in numerical order - the machine fixes that automatically. You can also save a litle memory space by ending a line with a semi-colon ; and immediately starting the next command. This ploy will work as long as: a) you don't exceed 102 characters on a line; or b) you don't set up an "IF"statement. (no ; allowed after an IF statement.)

One of the uses of the new Astrocade Basic EDIT function is the changing of line numbers. Suppose you got into a box, and the only way to get around it was to change a line number to something else. Say the command was 251 FOR A = 1 TO 40 and you had to change the line number to 389.

Type 251 PAUSE which gets you into the EDIT mode, and you see 251 FOR on the screen. Use the ERASE key to wipe out the FOR 1 5 2 and then retype the new number and the wiped-out command - 389 FOR continued use of the PAUSE key will bring back the rest of the line. Try a LIST 389,1 to see if the new line is correct. Then wipe out the old line by typing 251 GO . Don't forget that you have to replace the entry immediately after the line number. (This paragraph was based on material submitted by Ken Lill, who has other material in this issue. I took some editorial license and moved it into this area.)

There is a sort of standard procedure in program writing that places an interval of 10 between line numbers in a program. It is a convenience because it enables one to add more line numbers between existing lines in case it is necessary. The Arcade unit has the +10 key which automatically gives you a line mumber 10 higher than the previous one, so that by keying in (WORDS) GO the machine not only enters the statement, but adds 10 to the line number and displays it ready for the next command entry.

Volume 4 Number 9 ARCADIAN July 6, 1982

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Printed for the mutual edification of the publisher end subscribers who are owners of the ARCADE unit, its programmable BASIC cartridges, and the ZGress lenguage. Printing is by e COMPRINT 912S (programs) end a NEC 8023 (text - driven by en Apple with Super-Text end Magic Window word processing systems.)

Since the Newsletter is 95 percent subscriber-generated, materiel is elways in demend. Text meterial should be submitted as typewritten copy, preferably 47 cherecters per line and single spaced. Program meterial should be submitted both es a listing end on tape. Contributions ere accepted without peyment. However, programs entered in the Contest (accompenied by a signed statement indicating "this progrem is largely my own efforts and not e copy of en existing program") will be eligible for a prize. At leest three programs ere required for the Contest to operate. A panel of five judges will determine which of the submitted programs is "best." In addition, it is our policy to accumulate certain programs for subsequent sale on a tape, for which an author's royalty will be paid.

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```
  1 .
  2 .POLO
  3 .BY BOB HENSEL
 10 NT=0:@(5)=0:@(6)=0:FC=137:BC=5
 15 T=301
 16 CLEAR
 20 FOR A=-67TO 67STEP 11:BOX A,-7,1,72,1:NEXT A
 30 FOR A=-43TO 30STEP 9:BOX -1,A,133,1,1:NEXT A
 35 BOX -1,-7,135,74,3:BOX -1,30,135,1,3
 40 BOX -73,-7,12,19,1:BOX 72,-7,12,19,1
 50 BOX -50,37,34,11,1:BOX -45,37,22,9,2:BOX 49,37,34,11,1:BOX 44,37,22,9,2
 60 P=1:X=-60:Y=36:GOSUB 1000:GOSUB 2000:X=-72:Y=-7:GOSUB 1000:P=2:X=59:Y=36:GO
SUB 1000:GOSUB 2010:X=71:Y=-7:GOSUB 1000
 70 FOR A=1TO 8:X=-61+RND (10)b11:Y=-39+RND (6)b9:IF A<5GOSUB 2000
 80 IF A>4GOSUB 2010
 90 NEXT A
100 @(1)=-6:@(2)=5:@(3)=-21:@(4)=6:FOR P=1TO 2:X=@(P):Y=@(P+2):GOSUB 1000:NEXT
P
110 P=1
190 Z=0:B=-61:IF P=2B=60
200 D=RND (6):BOX -25,36,9,9,2:BOX -25,36,9,9,1:BOX -25,36, 7,7,2
220 IF D=1BOX -25, 36,1,1,1:GOTO 300
230 BOX -27,38,1,1,1:BOX -23,34,1,1,1:IF D=2GOTO 300
240 IF D>3BOX -27,34,1,1,1:BOX -23,38,1,1,1
250 IF D=4GOTO 300
260 IF D#6BOX -25,36,1,1,1
270 IF D=3GOTO 300
280 IF D=6BOX -25,38,1,1,1:BOX -25,34,1,1,1
300 .
310 X=71:P=P+1:IF P=3P=1:X=-72
311 IF JY(P)=0GOTO 314
312 BOX X,-7,6,13,1:Y=-3:IF JY(P)=-1Y=-12
313 GOSUB 1005
314 P=P+1:IF P=3P=1
320 IF Z>28GOTO 366
330 GOSUB 2015:IF JX(P)=0IF JY(P)=0GOTO 310
340 X=@(P)+Db11bJX(P):Y=@(P+2)+Db9bJY(P)
350 IF PX(X,Y)=0GOTO 330
352 IF Y<31IF Y>-44GOTO 356
354 GOTO 330
356 IF ABS(X)>65GOTO 900
360 BOX @(P),@(P+2),6,5,1:@(P)=X:@(P+2)=Y:GOSUB 1000
362 X=-5:IF P=2X=4
364 IF PX(X+@(P),@(P+2))=0GOTO 370
366 P=P+1:IF P=3P=1
368 GOTO 190
370 NT=1:X=@(P):Y=@(P+2):FOR A=1TO 3:BOX X,Y,6,5,1:GOSUB 1000:NEXT A:NT=0
372 @(P+4)=@(P+4)+1
380 GOTO 190
900 IF ABS(X)>75GOTO 330
910 IF Y>-13IF Y<0GOTO 930
920 GOTO 330
930 @(P+4)=@(P+4)+5
935 BOX @(P),@(P+2),6,6,1
938 GOSUB 1000
940 NT=15:MU=49:MU=51:MU=53:MU=56:MU=48:MU=53:MU=56:MU=48:MU=48:MU=48:NT=0:GOTO
16
```

AB or BB

Bob Hensel
8428 Ingleside Ave. South
Cottage Grove, MN 55016

```
  1 .
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  3 .BY BOB HENSEL
 10 NT=0:@(5)=0;@(6)=0;FC=137;BC=5
 15 T=301
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 20 FOR A=-67TO 67STEP 11;BOX A,-7,1,72,1;NEXT A
 30 FOR A=-43TO 30STEP 9;BOX -1,A,133,1,1;NEXT A
 35 BOX -1,-7,135,74,3;BOX -1,30,135,1,3
 40 BOX -73,-7,12,19,1;BOX 72,-7,12,19,1
 50 BOX -50,37,34,11,1;BOX -45,37,22,9,2;BOX 49,37,34,11,1;BOX 44,37,22,9,2
 60 P=1;X=-60;Y=36;GOSUB 1000;GOSUB 2000;X=-72;Y=-7;GOSUB 1000;P=2;X=59;Y=36;GO
SUB 1000;GOSUB 2010;X=71;Y=-7;GOSUB 1000
 70 FOR A=1TO 8;X=-61+RND (10)b11;Y=-39+RND (6)b9;IF A<5GOSUB 2000
 80 IF A>4GOSUB 2010
 90 NEXT A
100 @(1)=-6;@(2)=5;@(3)=-21;@(4)=6;FOR P=1TO 2;X=@(P);Y=@(P+2);GOSUB 1000;NEXT
P
110 P=1
190 Z=0;B=-61;IF P=2B=60
200 D=RND (6);BOX -25,36,9,9,2;BOX -25,36,9,9,1;BOX -25,36, 7,7,2
220 IF D=1BOX -25, 36,1,1,1;GOTO 300
230 BOX -27,38,1,1,1;BOX -23,34,1,1,1;IF D=2GOTO 300
240 IF D>3BOX -27,34,1,1,1;BOX -23,38,1,1,1
250 IF D=4GOTO 300
260 IF D#6BOX -25,36,1,1,1                          Bob Hensel
270 IF D=3GOTO 300                                  8428 Ingleside Ave. South
280 IF D=6BOX -25,38,1,1,1;BOX -25,34,1,1,1         Cottage Grove, MN  55016
300 .
310 X=71;P=P+1;IF P=3P=1;X=-72
311 IF JY(P)=0GOTO 314
312 BOX X,-7,6,13,1;Y=-3;IF JY(P)=-1Y=-12
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360 BOX @(P),@(P+2),6,5,1;@(P)=X;@(P+2)=Y;GOSUB 1000
362 X=-5;IF P=2X=4
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366 P=P+1;IF P=3P=1
368 GOTO 190
370 NT=1;X=@(P);Y=@(P+2);FOR A=1TO 3;BOX X,Y,6,5,1;GOSUB 1000;NEXT A;NT=0
372 @(P+4)=@(P+4)+1
380 GOTO 190
900 IF ABS(X)>75GOTO 330
910 IF Y>-13IF Y<0GOTO 930
920 GOTO 330
930 @(P+4)=@(P+4)+5
935 BOX @(P),@(P+2),6,6,1
938 GOSUB 1000
940 NT=15;MU=49;MU=51;MU=53;MU=56;MU=48;MU=53;MU=56;MU=48;MU=48;MU=48;NT=0;GOTO
16
```

```
1000 NT=5
1005 BOX X,Y,4,3,2;BOX X,Y-1,2,1,1;IF P=1BOX X+2,Y+2,2,2,2;BOX X-3,Y+1,1,2
1010 IF P=2BOX X-2,Y+2,2,2,2;BOX X+2,Y+1,1,1,2
1020 MU=67;NT=0;RETURN
2000 BOX X-5,Y+1,1,8,2;BOX X-1,Y-3,6,1,2;BOX X-1,Y+4,6,1,2;RETURN
2010 BOX X+4,Y+1,1,8,2;BOX X+1,Y-3,6,1,2;BOX X+1,Y+4,6,1,2;RETURN
2015 Z=Z+1;A=Zc2;IF RM=0RETURN
2018 BOX @(P),@(P+2),6,5,1
2020 T=T-1;CX=-5;CY=36;PRINT #1,Tc60,":",#1,RMc10,#1,RM
2022 Z=Z+1;CX=-51;CY=37;PRINT #2,@(5),;CX=38;PRINT #2,@(6),
2030 IF T=0GOTO 4000
2040 X=@(P);Y=@(P+2);GOSUB 1005;RETURN
4000 BOX 0,-3,62,26,2;CX=-25;CY=0;PRINT "GAME OVER
4010 IF JY(1)=1GOTO 15
4020 IF JY(1)=-1GOTO 1
4030 GOTO 4010
```

POLO is a two player game where the object is to score the most goals before time runs out. The computer will roll the dice and indicate the player who is up by making his horse blink off & on. The player then determins the best direction to move (up,down,diagonal) the number of squares on the dice, and uses JX & JY to make his move. If he lands in the opponents goal he scores 5 pts. If he lands on one of his own 'Lucky Horse Shoes' he scores 1 pt. and gets another turn, else play passes to his opponent. Each player has 15 sec. to make his move, or lose his turn. A defensive player can move his goalie up or down using JY. When time runs out, another period can be played by seting JY(1)-1. A new game is started with JY(1)--1.

CATCHEM: Player (1) uses his joystick to maneuver his blip through the pattern, avoiding Player (2)'s blip. If Player (2) is successful in overlaying his blip on the other one, he gets a point. Three points to win. Patterns are drawn randomly. The program is written in Astro Basic, and can be played in Bally Basic by deleting lines 7031, 7032, and 7050. Program is on page 89.

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* AD *

SFP's Video Game Catalog is Featuring Astrocade the Professional Arcade, and introducing the exciting new game Incredible Wizard. For prices and other Bally games and accessories, write; SFP D-A, 1064 N. Alta Ave., Dinuba CA 93618. (209)591-0555

```
1000 NT=5
1005 BOX X,Y,4,3,2;BOX X,Y-1,2,1,1;IF P=1BOX X+2,Y+2,2,2,2;BOX X-3,Y+1,1,1,2
1010 IF P=2BOX X-2,Y+2,2 2,2;BOX X+2,Y+1,1,1,2
1020 MU=67;NT=0;RETURN
2000 BOX X-5,Y+1,1,8,2;BOX X-1,Y-3,6,1,2;BOX X-1,Y+4,6,1,2;RETURN
2010 BOX X+4,Y+1,1,8,2;BOX X+1,Y-3,6,1,2;BOX X+1,Y+4,6,1,2;RETURN
2015 Z=Z+1;A=Zc2;IF RM=0RETURN
2018 BOX @(P),@(P+2),6,5,1
2020 T=T-1;CX=-5;CY=36;PRINT #1,Tc60,":",#1,RMc10,#1,RM
2022 Z=Z+1;CX=-51;CY=37;PRINT #2,@(5),;CX=38;PRINT #2,@(6),
2030 IF T=0GOTO 4000
2040 X=@(P);Y=@(P+2);GOSUB 1005;RETURN
4000 BOX 0,-3,62,26,2;CX=-25;CY=0;PRINT "GAME OVER
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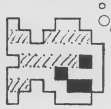
The Bit Fiddlers ™



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This program will only run in Astro-Basic. For a listing that will run in Baily Basic send SASE to Arcadian, 3626 Morrie Dr., San Jose, CA 95127-9990

ASTRO ZAP 2000

BY GEORGE MOSES

ASTRO ZAP is similar to the commercial arcade game "SPACE ZAP" by Midway, only you don't need a quarter to play. It will keep score for up to four humans, using 1 hand control for each. When you RUN the program, input the number of players from the keypad. When the game starts you will use only the joystick to fire back at the invading missiles. No trigger is necessary. You will receive 250 points for each missile you eliminate. A Kamikaze will orbit your space fortress at random intervals. You must shoot it down before the second orbit or it will dive into you. Each human begins with three bases and will be awarded a bonus base every 10,000 points. As points accumulate the missiles will travel faster until you can no longer keep up with the onslaught. If the missile hits the base there will be a terrible explosion which goes on and on and on. If you get sick of watching yourself explode, pull the trigger to abort the fireworks. This will bring up the next player's turn. The only other use of the trigger is at the GAME OVER display if you wish to start a new game.

IMPORTANT. Never **put any spaces in this program unless you see the "■" symbol.** Any spaces you see are only in there for clarity. A word of caution about the letter "O" (as in OH). It is used as a variable in lines 21, 22, 101 and 510. Use care not to confuse it with the "0" (as in zero.) Also use the computer command word "INPUT" in line 500 instead of typing the word out. You should have 47 bytes of memory left. a minimum of 40 bytes are needed to handle the scorekeeping strings.

```
 1 NT=0;GOTO X
 2 FOR K=1TO B;NEXT K;RETURN
 3 TA=44;TB=53;TC=67;RETURN
 4 VA=6;VB=6;VC=6;RETURN
 5 CX=M;CY=N;RETURN
 6 NV=T;MO=0;NM=1;RETURN
 7 N=0;M=MO (30);RETURN
20 BOX 0,0,24,18,1;BOX 0,0,24,12,3;BOX
   0,0,18,18,3;BOX 0,0,20,1,3;BOX 0,0,1,14,3
21 FC=149;BC=8;C=1;CY=32;CX=−71;PRINT
   #1,@(O), ;IF @(F)=0PRINT #1,"00",
22 PRINT #1,@(F);IF @(O)►4C=@(O)÷J
23 IF @(P)=10@(P)=0;GOSUB 4;GOSUB
   3;MO=44;L=1;FOR A=1TO
   6;B=T;CY=0;CX=−26;PRINT
   "BONUS■BASE";MO=44;GOSUB 2;MO=89
24 IF B=T■B=S;BOX 0,0,60,8,2;GOSUB 2;
   NEXT A;↓;@(H)=@(H)+1;
   @(Q)=@(Q)+1;GOTO 511
25 IF L GOSUB 4;MO=T;GOSUB 3;GOSUB
   U;L=L−1;↓;B=V;GOSUB 2;IF L GOTO 25
26 N=N+1;IF N=M GOTO 70
27 IF B=V GOSUB 2
30 GOSUB 3;GOSUB 4;C=ABS(C);E=RND
   (4)+93;MO=T;IF E=94B=−40;GOTO 60
31 IF E=95B=64;C=−C
32 IF E=96B=40;C=−C;GOTO 60
33 IF E=97B=−64
50 CY=0;FOR A=B TO B÷6STEP
   C;MO=A;CX=A;TV=E;IF JX(F)IF
   JY(F)=0XY=0;LINE ABS(A)×JX(F),0,3;IF
   PX(A,0)=0GOTO R
51 NEXT A;GOTO S
```

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```
60 FOR A=B TO B÷5STEP
   C;MO=A;CX=0;CY=A;TV=E;IF JY(F)IF
   JX(F)=0XY=0;LINE 0,ABS(A)×JY(F),3;IF
   PX(0,A)GOTO R
61 NEXT A;GOTO S
70 B=V;GOSUB 3;GOSUB 4;MO=20;
   VR=4;VF=50;M=0;N=0;N=30;D=−10;E=0
75 IF M■D=D+ABS(M)÷(−M)×2
76 IF N■E=E+ABS(N)÷(−N)×2
95 GOSUB 5;PRINT "+";GOSUB 5;PRINT "×";GOSUB
   5;PRINT"■";FOR A=1TO 2;XY=0;LINE
   0,30×JY(F),3;XY=0;LINE 33×JX(F),0,3;IF
   PX(M,N)GOSUB 7;GOTO R
96 NEXT A;M=M+D;N=N+E;IF N=30E=E+3
98 IF M=0IF N=0GOTO S
99 GOTO 75
100 GOSUB 6;FOR A=2TO 10STEP 2;BC=RND
   (T);FC=BC−4;BOX CX−6,CY,A,A,3;NEXT A
101 BOX 0,0,W,10,2;BOX 0,0,10,88,2;↑;@(F)=@(F)+T;IF
   @(F)=V@(F)=0;@(P)=@(P)+1;@(O)=@(O)+1
110 GOTO 20
200 GOSUB 6;FOR A=2TO W;CX=RND
   (A)−A÷2;BC=RND (T);FC=BC−4;
   CY=RND (A÷2)−A÷4;XY=0;LINE RND
   (W)−81,RND (88)−45,3;TV=46;NV=RND (2)+1
201 IF TR(F)=0NEXT A
211 L=1;@(H)=@(H)−1
215 H=H+1;IF H►G+G■H=G+1
216 CLEAR ;FOR A=G+1TO G+4;IF @(A)=0NEXT
   A;BC=0;FC=149;CY=−8;CX=−28;
   PRINT "GAME■OVER";↓;GOTO V
220 ↓;NEXT F;GOTO Y
300 FOR MO=T TO 5STEP−1;A=1;NEXT MO;IF
   L=2FOR MO=5TO T;A=1;NEXT MO
301 RETURN
500 FOR A=0TO Z;@(A)=0;NEXT A;FOR A=17TO
   20;@(A)=2;NEXT A;CLEAR ;CY=0;PRINT "INPUT
   #■PLAYERS", ;G=KP−48;IF (G◄1)+(G►4)RUN
501 PRINT#2,G;FOR A=G+1TO G+G;@(A)=3;NEXT
   A;H=G+1;L=2
510 CLEAR ;FOR F=1TO
   G;O=F+8;P=F+12;Q=F+Z;GOSUB 7
511 CY=40;PRINT
   "■PLAYER",#2,F;J=@(Q)−1;CY=−32;PRINT
   "■BASES";PRINT #4,@(H),
512 IF @(H)=0GOTO 215
514 GOTO 20
1000 CY=40;CX=36;PRINT "SCORE";FOR A=1TO
   G;CX=24;PRINT #1,"#",A,"■",@(A+8), ;IF
   @(A)=0PRINT #1,"00",
1010 PRINT #1,@(A);NEXT A
1020 IF TR(1)RUN
1030 GOTO 1020
```

Because all memory is used up the variables R through Z must be loaded as direct commands from the keypad to make this program work.

Type the following without a line number:

```
R=100;S=200;T=250;U=300;V=1000;
W=160;X=500;Y=510;Z=16;RUN
```

WHEN YOU PRESS GO your program should run perfectly. To save the program on tape just use **:PRINT GO with your recorder running on RECORD.**

ASTRO ZAP 2000

BY GEORGE MOSES

ASTRO ZAP is similar to the commercial arcade game "SPACE ZAP" by Midway, only you don't need a quarter to play. It will keep score for up to four humans, using 1 hand control for each. When you RUN the program, input the number of players from the keypad. When the game starts you will use only the joystick to fire back at the invading missiles. No trigger is necessary. You will receive 250 points for each missile you eliminate. A Kamikaze will orbit your space fortress at random intervals. You must shoot it down before the second orbit or it will dive into you. Each human begins with three bases and will be awarded a bonus base every 10,000 points. As points accumulate the missiles will travel faster until you can no longer keep up with the onslaught. If the missile hits the base there will be a terrible explosion which goes on and on and on. If you get sick of watching yourself explode, pull the trigger to abort the fireworks. This will bring up the next player's turn. The only other use of the trigger is at the GAME OVER display if you wish to start a new game.

IMPORTANT. Never put any spaces in this program unless you see the "■" symbol. Any spaces you see are only in there for clarity. A word of caution about the letter "O" (as in OH). It is used as a variable in lines 21, 22, 101 and 510. Use care not to confuse it with the "0" (as in zero.) Also use the computer command word "INPUT" in line 500 instead of typing the word out. You should have 47 bytes of memory left. a minimum of 40 bytes are needed to handle the scorekeeping strings.

```
 1 NT=0;GOTO X
 2 FOR K=1TO B;NEXT K;RETURN
 3 TA=44;TB=53;TC=67;RETURN
 4 VA=6;VB=6;VC=6;RETURN
 5 CX=M;CY=N;RETURN
 6 NV=T;MO=0;NM=1;RETURN
 7 N=0;M=RND (30);RETURN
20 BOX 0,0,24,18,1;BOX 0,0,24,12,3;BOX
   0,0,18,18,3;BOX 0,0,20,1,3;BOX 0,0,1,14,3
21 FC=149;BC=8;C=1;CY=32;CX=-71;PRINT
   #1,@(O), ;IF @(F)=0PRINT #1,"00",
22 PRINT #1,@(F);IF @(O)►4C=@(O)÷J
23 IF @(P)=10@(P)=0;GOSUB 4;GOSUB
   3;MO=44;L=1;FOR A=1TO
   6;B=T;CY=0;CX=-26;PRINT
   "BONUS■BASE";MO=44;GOSUB 2;MO=89
24 IF B=T■B=S;BOX 0,0,60,8,2;GOSUB 2;
   NEXT A;↑;@(H)=@(H)+1;
   @(Q)=@(Q)+1;GOTO 511
25 IF L GOSUB 4;MO=T;GOSUB 3;GOSUB
   U;L=L-1;↑;B=V;GOSUB 2;IF L GOTO 25
26 N=N+1;IF N=M GOTO 70
27 IF B=V GOSUB 2
30 GOSUB 3;GOSUB 4;C=ABS(C);E=RND
   (4)+93;MO=T;IF E=94B=-40;GOTO 60
31 IF E=95B=64;C=-C
32 IF E=96B=40;C=-C;GOTO 60
33 IF E=97B=-64
50 CY=0;FOR A=B TO B÷6STEP
   C;MO=A;CX=A;TV=E;IF JX(F)IF
   JY(F)=0XY=0;LINE ABS(A)×JX(F),0,3;IF
   PX(A,0)=0GOTO R
51 NEXT A;GOTO S
```

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This program will only run in Astro-Basic. For a listing that will run in Bally Basic send SASE to Arcadian, 3626 Morrie Dr., San Jose, CA 95127-9990

```
60 FOR A=B TO B÷5STEP
   C;MO=A;CX=0;CY=A;TV=E;IF JY(F)IF
   JX(F)=0XY=0;LINE 0,ABS(A)×JY(F),3;IF
   PX(0,A)GOTO R
61 NEXT A;GOTO S
70 B=V;GOSUB 3;GOSUB 4;MO=20;
   VR=4;VF=50;M=0;N=30;D=-10;E=0
75 IF M■D=D+ABS(M)÷(-M)×2
76 IF N■E=E+ABS(N)÷(-N)×2
95 GOSUB 5;PRINT "↑";GOSUB 5;PRINT "↓";GOSUB
   5;PRINT"■";FOR A=1TO 2;XY=0;LINE
   0,30×JY(F),3;XY=0;LINE 33×JX(F),0,3;IF
   PX(M,N)GOSUB 7;GOTO R
96 NEXT A;M=M+D;N=N+E;IF N=30E=E+3
98 IF M=0IF N=0GOTO S
99 GOTO 75
100 GOSUB 6;FOR A=2TO 10STEP 2;BC=RND
   (T);FC=BC-4;BOX CX-6,CY,A,A,3;NEXT A
101 BOX 0,0,W,10,2;BOX 0,0,10,88,2;↑;@(F)=@(F)+T;IF
   @(F)=V@(F)=0;@(P)=@(P)+1;@(O)=@(O)+1
110 GOTO 20
200 GOSUB 6;FOR A=2TO W;CX=RND
   (A)-A÷2;BC=RND (T);FC=BC-4;
   CY=RND (A÷2)-A÷4;XY=0;LINE RND
   (W)-81,RND (88)-45,3;TV=46;NV=RND (2)+1
201 IF TR(F)=0NEXT A
211 L=1;@(H)=@(H)-1
215 H=H+1;IF H►G+G■H=G+1
216 CLEAR ;FOR A=G+1TO G+4;IF @(A)=0NEXT
   A;BC=0;FC=149;CY=-8;CX=-28;
   PRINT "GAME■OVER";↑;GOTO V
220 ↑;NEXT F;GOTO Y
300 FOR MO=T TO 5STEP-1;A=1;NEXT MO;IF
   L=2FOR MO=5TO T;A=1;NEXT MO
301 RETURN
500 FOR A=0TO Z;@(A)=0;NEXT A;FOR A=17TO
   20;@(A)=2;NEXT A;CLEAR ;CY=0;PRINT "INPUT
   #■PLAYERS", ;G=KP-48;IF (G◄1)+(G►4)RUN
501 PRINT#2,G;FOR A=G+1TO G+G;@(A)=3;NEXT
   A;H=G+1;L=2
510 CLEAR ;FOR F=1TO
   G;O=F+8;P=F+12;Q=F+Z;GOSUB 7
511 CY=40;PRINT
   "■PLAYER",#2,F;J=@(Q)-1;CY=-32;PRINT
   "■BASES";PRINT #4,@(H),
512 IF @(H)=0GOTO 215
514 GOTO 20
1000 CY=40;CX=36;PRINT "SCORE";FOR A=1TO
   G;CX=24;PRINT #1,"#",A,"■",@(A+8), ;IF
   @(A)=0PRINT #1,"00",
1010 PRINT #1,@(A);NEXT A
1020 IF TR(1)RUN
1030 GOTO 1020
```

Because all memory is used up the variables R through Z must be loaded as direct commands from the keypad to make this program work.

Type the following without a line number:

```
R=100;S=200;T=250;U=300;V=1000;
W=160;X=500;Y=510;Z=16;RUN
```

WHEN YOU PRESS GO your program should run perfectly. To save the program on tape just use :**PRINT GO with your recorder running on RECORD.**

```
 1 NT=0
 2 R=0;A=5;B=0;D=43;E=0;S=0;W=0
 3 Z=RND (100)+20
 10 CLEAR
 20 &(10)=0
 30 CX=-16;CY=0
 40 BC=153;FC=84
 50 PRINT "CATCHEM"
 60 BOX 0,0,45,9,3
 65 PRINT ;PRINT ;PRINT "        BY SCOTT TAYLOR"
 70 &(10)=176
 80 NT=2
 90 FOR X=1TO 500;NEXT X;CLEAR
 95 BC=8;FC=157
110 BOX 0,0,150,73,1;BOX 0,0,132,62,3
120 BOX 0,0,132,62,2;FOR X=-55TO 55STEP 18
130 BOX X,0,4,36,1;NEXT X
140 GOSUB 2000
150 BOX 0,0,132,62,2;FOR Y=-35TO 35 STEP 18
155 BOX 0,Y,100,4,1
160 NEXT Y
170 BOX 0,-35,120,4,2
172 Z=RND (100)+20;W=0
175 R=R+1
180 CX=0;CY=-39;PRINT "ROUNDa",#1,R
190 GOTO 2000
1999 GOTO 1999
2000 IF JY(1)=1 B=B+4
2002 W=W+1
2010 IF JY(2)=1 E=E+5
2015 IF W=Z GOTO 8000
2020 IF JY(1)=-1B=B-4
2030 IF JY(2)=-1E=E-5
2040 IF JX(1)=1 A=A+4
2045 IF JX(2)=1 D=D+5
2050 IF JX(1)=-1A=A-4
2060 IF JX(2)=-1D=D-5
2066 GOTO 2085
2070 BOX A,B,2,2,1;BOX A,B,2,2,2
2080 BOX D,E,3,3,1;BOX D,E,3,3,2
2083 GOTO 2000
2085 .
2090 IF PX(A,B+4)=1 B=B-4
2100 IF PX(A+4,B)=1 A=A-4
2110 IF PX(A,B-4)=1 B=B+4
2120 IF PX(A-4,B)=1 A=A+6
2130 IF PX(D,E+4)=1 E=E-5
2140 IF PX(D+4,E)=1 D=D-5
2150 IF PX(D,E-4)=1 E=E+5
2151 IF R=3 GOTO 7000
2155 IF PX(D-4,E) D=D+5
2156 GOSUB 5000
2170 GOTO 2070
4000 S=S+1;CX=0;CY=-39;PRINT "SCOREa",#1,S
4005 A=5;B=0;D=43;E=0
4006 FOR Q=65TO 91;MU=Q;NEXT Q
4010 GOTO 175
5000 IF D+2=A GOTO 5020
5001 IF D+1=A GOTO 5020
5002 IF D+3=A GOTO 5020
5005 IF D+4=A GOTO 5020
5010 IF D-2=A GOTO 5020
5011 IF D-1=A GOTO 5020
5012 IF D-3=A GOTO 5020
5015 IF D-4=A GOTO 5020
5017 RETURN
5020 IF E=B GOTO 4000
5025 IF E-1=B GOTO 4000
5027 IF E+2=B GOTO 4000
5028 IF E+3=B GOTO 4000
5030 IF E=B GOTO 4000
5035 IF E+1=B GOTO 4000
5037 IF E-2=B GOTO 4000
5038 IF E-3=B GOTO 4000
5040 RETURN
7000 CLEAR
7010 BC=88;FC=155
7015 CX=-50;CY=-37
7016 PRINT "SCORE:",#1,S
7020 PRINT ;PRINT ;PRINT
7030 PRINT "          GAME OVER"
7031 VA=15;VB=15
7032 TA=RND (15);TB=RND (15)
7040 BOX 12,17,60,10,3
7050 GOTO 7031
8000 I=RND (2)
8010 W=0;Z=RND (100)+20
8020 IF I=1 GOTO 120
8030 IF I=2 GOTO 150
8040 GOTO 8000
10000 GOTO 10000
```

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14035 Dix
Southgate, MI 48195

See page 87 for instructions

```
  1 NT=0
  2 R=0;A=5;B=0;D=43;E=0;S=0;W=0
  3 Z=RND (100)+20
 10 CLEAR
 20 &(10)=0
 30 CX=-16;CY=0
 40 BC=153;FC=84
 50 PRINT "CATCHEM"
 60 BOX 0,0,45,9,3
 65 PRINT ;PRINT ;PRINT "         BY SCOTT TAYLOR"
 70 &(10)=176
 80 NT=2
 90 FOR X=1TO 500;NEXT X;CLEAR
 95 BC=8;FC=157
110 BOX 0,0,150,73,1;BOX 0,0,132,62,3
120 BOX 0,0,132,62,2;FOR X=-55TO 55STEP 18
130 BOX X,0,4,36,1;NEXT X
140 GOTO  2000
150 BOX 0,0,132,62,2;FOR Y=-35TO 35 STEP 18
155 BOX 0,Y,100,4,1
160 NEXT Y
170 BOX 0,-35,120,4,2
172 Z=RND (100)+20;W=0
175 R=R+1
180 CX=0;CY=-39;PRINT "ROUNDα",#1,R
190 GOTO 2000
1999 .
2000 IF JY(1)=1 B=B+4
2002 W=W+1
2010 IF JY(2)=1 E=E+5
2015 IF W=Z GOTO 8000
2020 IF JY(1)=-1B=B-4
2030 IF JY(2)=-1E=E-5
2040 IF JX(1)=1 A=A+4
2045 IF JX(2)=1 D=D+5
2050 IF JX(1)=-1A=A-4
2060 IF JX(2)=-1D=D-5
2066 GOTO 2085
2070 BOX A,B,2,2,1;BOX A,B,2,2,2
2080 BOX D,E,3,3,1;BOX D,E,3,3,2
2083 GOTO 2000
2085 .
2090 IF PX(A,B+4)=1 B=B-4
2100 IF PX(A+4,B)=1 A=A-4
2110 IF PX(A,B-4)=1 B=B+4
2120 IF PX(A-4,B)=1 A=A+6
2130 IF PX(D,E+4)=1 E=E-5
2140 IF PX(D+4,E)=1 D=D-5
2150 IF PX(D,E-4)=1 E=E+5
2151 IF R=3 GOTO 7000
2155 IF PX(D-4,E) D=D+5
2156 GOSUB 5000
2170 GOTO 2070
4000 S=S+1;CX=0;CY=-39;PRINT "SCOREα",#1,S
4005 A=5;B=0;D=43;E=0
4006 FOR Q=65TO 91;MU=Q;NEXT Q
4010 GOTO 175
5000 IF D+2=A GOTO 5020
5001 IF D+1=A GOTO 5020
5002 IF D+3=A GOTO 5020
5005 IF D+4=A GOTO 5020
5010 IF D-2=A GOTO 5020
5011 IF D-1=A GOTO 5020
5012 IF D-3=A GOTO 5020
5015 IF D-4=A GOTO 5020
5017 RETURN
5020 IF E=B GOTO 4000
5025 IF E-1=B GOTO 4000
5027 IF E+2=B GOTO 4000
5028 IF E+3=B GOTO 4000
5030 IF E=B GOTO 4000
5035 IF E+1=B GOTO 4000
5037 IF E-2=B GOTO 4000
5038 IF E-3=B GOTO 4000
5040 RETURN
7000 CLEAR
7010 BC=88;FC=155
7015 CX=-50;CY=-37
7016 PRINT "SCORE:",#1,S
7020 PRINT ;PRINT ;PRINT
7030 PRINT "              GAME OVER"
7031 VA=15;VB=15                    *
7032 TA=RND (15);TB=RND (15)        *
7040 BOX 12,17,60,10,3
7050 GOTO 7031                      *
8000 I=RND (2)
8010 W=0;Z=RND (100)+20
8020 IF I=1 GOTO 120
8030 IF I=2 GOTO 150
8040 GOTO 8000
```

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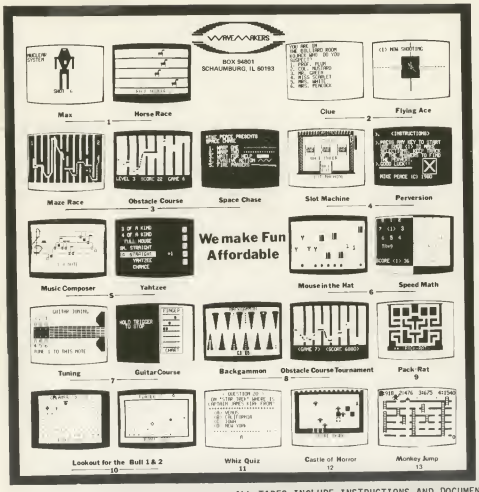
14035 Dix
Southgate, MI 48195

* Delete for BB

See page 87 for instructions



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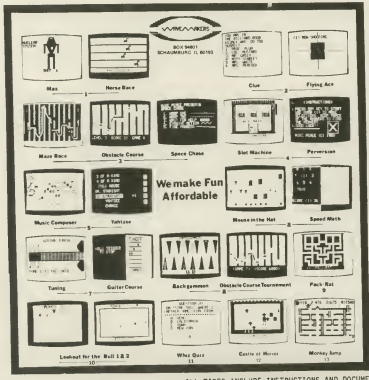

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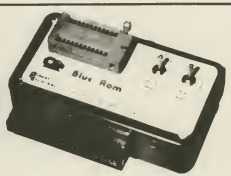

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You can use the Blue Ram to copy a game cartridge on regular cassette tape using the machine language routines included in the Blue Ram Utility program. Learn Z-80 machine code and modify an existing game cartridge! Write your own cartridge! And, with the 24 port socket on the Blue Ram you can adapt your computer to drive a modem, a printer, a keyboard and many other applications! Regular price is $249.95.

Blue Ram Extended Basic Cartridge Written by Jay Fenton and John Perkins to take advantage of the Blue Ram's exclusive input and output ports, hardware and software switching mechanisms, and the Astrocade's outstanding game and graphics design capabilities. Gives up to 15,500 bytes of programming space with special POINT, CIRCLE and SNAP commands, 4 colors, built-in math routines, keyboard and printer-driving logic, 300 baud or 2000 baud data output and much more! Will not operate without a Blue Ram or other extended memory. Regular price is $49.95.

INTRODUCTORY OFFER! New 16K Blue Ram and the Extended Basic Cartridge, a $300.00 value

$275

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When ordering specify whether you have 300 baud Bally Basic or 2000 baud Astrocade Basic

USING THE "EDITOR" OF THE ASTRO-BASIC

One of the best things that Jay Fenton put into the "new" BASIC cartrige is the EDITOR. With it you can change any information in any line INCLUDING the line number, with EASE! I've worked with "EDIT" features of other computers and I beleive that ASTRO'S is the easiest! Let's take a sample program:

```
)10 FOR A=0TO100STEP10
)20 NEXT A;@(A)=A
)30 *(A)=@(A)
)40 PRINT A;PRINT @(A);PRINT *(A)
```

Let's say you want line)10 to read:

```
)10 FOR A=0TO 10STEP 2
```

First KEY-IN 10 and then press the PAUSE* button until you see the second "0" in the number 100. hit the ERASE key once. Then press the PAUSE key to get the word STEP to appear. KEY-IN the number 2 and hit GO. Now your "EDITing" is done! Easy, wasn't it?

Now let's add something to line)30. KEY-IN 30 and press PAUSE until you get to the "=" sign. Now KEY-IN A;. Press PAUSE until the last BYTE of the line ")" appears on the screen, and KEY-IN =A. Now KEY-IN CLEAR;LIST GO. Your LISTing should look like this:

```
)10 FOR A=0TO10STEP 2
)20 NEXT A;@(A)=A
)30 *(A)=A;@(A)=A
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```

Let's change line)20 to make it line)50. First KEY-IN 20, and press the PAUSE only ONCE. the word NEXT should be on the screen. Now press ERASE until the line number has been ERASEd. Don't worry, you can't ERASE out of the EDITOR mode! Now put the new line number in, 50, and KEY-IN the BYTE you ERASEd from the line, NEXT. Press the PAUSE once again. Since you have already put @(A)=A in)30, you can now press GO. Press CLEAR;LIST GO again and your LISTing should now look like this:

```
)10 FOR A=0TO 20STEP 2
)20 NEXT A;@(A)=A
)30 *(A)=A;@(A)=A
)40 PRINT A;PRINT @(A);PRINT *(A)
)50 NEXT A
```

Ken Lill
5039 S. Elizabeth
Chicago, Ill. 60609

Now all you need to do to complete your program is to KEY-IN 20 GO. This will delete line)20.

EXITING THE "EDITOR" MODE

There are four ways to exit the EDITOR mode. They are:

1. Press PAUSE until you have gone PAST the last byte of the line you have EDITed. This will place the corrected line into the memory!
2. Press HALT . This will NOT put any of your corrections into the line! Instead, it will leave the line as it was BEFORE you used the EDITOR!!!
3. Press GO . This will put your EDITed line into memory MINUS any data that may have been in the line AFTER the point you pressed GO
4. Press RESET . We all know what happens then- GOODBYE PROGRAM!!!!!!!!

*Pressing WORDS SPACE has the same effect as pressing PAUSE to enter, work with, or exit the EDITOR!!!

ATTENTION!!
Announcing a once in a lifetime chance to purchase an extensive hardware/& software library at less than half of the original cost. (Everything is clean and in new or near new condition.)

Bally Astrocade (wood grain finish)
2 bandcontrols
Old Basic...Interface...Instruction Book & storage box
New Basic...Patch cord..Instruction Book
Videocades...
Seawolf / Missile
Football
Baseball / Tennis
Bally Pinball
Clowns / Brickyard
Space Invaders
Galactic Invasion
Elementary/Bingo Math

Machine Language Manager w/ demo tape & manual
Ze Minicourse w/ demo & utility tape

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All Tiny Arcade programs
All Video Wizards programs

16 cassette tapes (old basic) with typed index...includes almost all programs available in the Arcadian and Cursor newsletters.

4- 90min. TDK's (packed with most every program available) in New Basic
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From the company that was the first to bring you 16K memory expansion, a professional 62-key full size ASCII keyboard, and the excellent Extended Basic language -- we would like to announce our first software contest. The winner of this contest will recieve a complete Viper Operating System or $500 in cash!! The Viper Operating System includes these items:

3K dynamic RAM memory
1 Viper keyboard (with extension cable)
1 Viper dual port-bidirectional RS232 communications board
1 Extended Basic cartridge with 2K/4K baud tape interface
1 5-slot micro expander bus with terminator card
1 Viper cabinet with power interface board and cable

All entries must include a listing with comments, and the program on tape. Any language is acceptable (AB, BB, EB, machine code, etc) and there are no restraints on the program - any program type will be allowed (examples: educational, game, business, etc) - and the winning program will be chosen on its creativity and originality.

Programs previously or currently offerred for sale will not be eligible. The winning entry will become the property of Alternative Engineering Co., The judging will be done by AEC personnel and the results will be final. The contest is now in operation and will end Oct 20, 1982. The winner will be notified by Nov 5, 1982.

We do more than talk expansion - we make it a reality!! Look for the entry blank in the next issue of the ARCADIAN.

INSTRUCTIONS for Battleship:

START WITH REGULAR VERSION (0)
START PLAY WITH PLAYER #1 PLACING (HIDING) HIS FLEET OF SHIPS
(DON'T LET THE ENEMY WATCH!)

THE JOYSTICK CONTROLS WHERE EACH SHIP IS TO BE PLACED, THE TRIGGER PUTS IT IN

ALL SHIPS MUST BE PLACED IN A STRAIGHT LINE, EITHER HORIZONTAL, VERTICAL, OR DIAGONAL
ALL SHIPS OF THE SAME TYPE MUST TOUCH EACH OTHER
SHIPS NOT OF THE SAME TYPE MAY BUT DO NOT HAVE TO TOUCH EACH OTHER

EACH PLAYER STARTS WITH THE SAME COMPLIMENT OF SHIPS AS FOLLOWS:

5 AIRCRAFTCARRIERS (A)
4 BATTLESHIPS (B)
4 DESTROYERS (D)
3 CRUISERS (C)
2 SUBS (S)

AFTER BOTH PLAYERS HAVE PLACED THEIR FLEETS THEY MAY SHOOT THEIR 3 SHOT SALVOS,
USING THE JOYSTICK TO LOCATE AND THE TRIGGER TO FIRE EACH SHOT

HITS ARE NOT SHOWN UNTIL AFTER ALL3 SHOTS ARE FIRED

ALL HITS ARE DISPLAYED BY SHIP TYPE

Note that the Advanced Version (1) shows only a "+" for hits, making it more difficult to analyze the board.

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AB or BB

BATTLESHIP

BY BILL MEAD

2940-H GRACE LANE
COSTA MESA, CA 92626
714/549-3227

```
 5 NT=1;CLEAR ;BC=125;Z=0;P=1;U=0;O=0;GOTO 150
10 BOX 0,40,150,7,2;IF P=1CX=8;CY=40
11 IF P=2CX=-65;CY=40
12 PRINT "*",#1,P,;IF (O=18)+(U=18)PRINT " WINS";STOP
13 IF Z=1PRINT " SHOOTS";GOTO 15
14 PRINT " HIDES
15 RETURN
20 H=8;V=-40;X=0;Y=0
28 BOX H,V,2,2,3
30 IF JX(P)=-1H=H-7;X=X-1;IF X<0X=0
32 IF H<8H=8
35 IF JX(P)=1H=H+7;X=X+1;IF X>9X=9
36 IF H>71H=71
37 IF JY(P)=-1V=V-8;Y=Y-1;IF Y<0Y=0
38 IF V<-40V=-40
39 IF JY(P)=1V=V+8;Y=Y+1;IF Y>9Y=9
40 IF V>32V=2
42 BOX H,V,2,2,3
43 IF Z=1IF TR(P)GOTO 1260
44 IF Z#1IF TR(P)GOTO 1075
45 GOTO 28
50 H=-70;V=-40;X=0;Y=0
52 BOX H,V,2,2,3
54 IF JX(P)=-1H=H-7;X=X-1;IF X<0X=0
55 IF H<-70H=-70
56 IF JX(P)=1H=H+7;X=X+1;IF X>9X=9
57 IF H>-7H=-7
58 IF JY(P)=-1V=V-8;Y=Y-1;IF Y<0Y=0
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60 IF JY(P)=1V=V+8;Y=Y+1;IF Y>9Y=9
61 IF V>32V=32
68 BOX H,V,2,2,3
69 IF Z#1IF TR(P)GOTO 1075
70 IF Z=1IF TR(P)GOTO 1260
72 GOTO 52
100 P=P+1;IF P>2P=1
105 RETURN
150 INPUT "REGULAR (0)   ADVANCED (1)"W
160 CLEAR ;GOTO 1000
199 IF W=1PRINT "+",;RETURN
200 GOTO M+200
201 PRINT "A",;RETURN
202 PRINT "B",;RETURN
203 PRINT "D",;RETURN
204 PRINT "C",;RETURN
205 PRINT "S",;RETURN
300 H=@(F)c100;V=RMc10;M=RM
310 IF P=1CX=Hb7+8;CY=Vb8-40
320 IF P=2CX=Hb7-70;CY=Vb8-40
330 RETURN
400 &(18)=62;&(19)=29;&(22)=229
410 FOR Q=25TO 45
420 NT=0;&(16)=Q
430 FOR R=1TO 10
440 NEXT R;NEXT Q
442 GOSUB 199
446 FOR R=16TO 23
448 &(R)=255;NEXT R
449 FOR R=1TO 300;NEXT R
450 FOR R=255TO 200STEP -1
451 &(21)=R;&(22)=R;NEXT R
460 FOR R=16TO 23;&(R)=0;NEXT R
465 IF P=1O=O+1;IF O=18GOTO 10
467 IF P=2U=U+1;IF U=18GOTO 10
470 RETURN
1000 FOR A=-70TO -5STEP 7
1010 FOR B=-40TO 33STEP 8
1020 BOX A,B,6,7,1
1025 BOX A+78,B,6,7,3
1030 NEXT B
1040 NEXT A
1045 IF P=3GOTO 1210
1050 GOSUB 10
1065 FOR F=1TO 18
1070 IF P=1GOTO 50
1073 IF P=2GOTO 20
1075 CX=H;CY=V
1078 IF PX(CX,CY+2)=0GOTO 1070
1080 IF F<6PRINT "A",;A=1;E=A
1090 IF F>5IF F<10PRINT "B",;B=2;E=B
1100 IF F>9IF F<14PRINT "D",;D=3;E=D
1110 IF F>13IF F<17PRINT "C",;C=4;E=C
1120 IF F>16IF F<19PRINT "S",;S=5;E=S
1122 IF P=1@(F)=Xb100+Yb10+E
1125 IF P=2@(F+20)=Xb100+Yb10+E
1130 NEXT F
1200 P=P+1;CLEAR ;GOTO 1000
1210 Z=1;GOSUB 100;GOSUB 10
1220 IF P=1FOR K=41TO 43
1230 IF P=2FOR K=44TO 46
1240 IF P=1GOTO 20
1250 IF P=2GOTO 50
1260 CX=H;CY=V;PRINT *",
1265 @(K)=Xb100+Yb10
1270 NEXT K
1280 IF P=1FOR K=41TO 43
1290 IF P=2FOR K=44TO 46
1300 IF P=1FOR F=21TO 38
1310 IF P=2FOR F=1TO 18
1315 GOSUB 300
1320 IF @(K)=@(F)c10b10GOSUB 400
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- For Sale: Bally Arcade, both Basics, 280z/Baseball/Clowns/Pinball/Baron/TicTacToe/Black Jack/AstroBattle/2 Football/StarBattle/SpaceFortress/ Sea Wolf/Galaxian/GrandPrix/ 6 hand controllers/Cassette Interface, several tapes, All Arcadian/Cursor + Basic Express.Best offer over 500. Larry Loiacono Box 627 Mechanicsburg PA 17055 (717-697-3042)
- Looking For: Seawolf/Baseball/ or Bally Pin. I'll pay $17 for any of these.Ben Pavone 259 Prospect St.Westfield, NJ 07090,201-233-1277 call before sending videocades
- For Sale: Arcade with 2 controllers, 12 cartridges incl. new Basic under 3 months old,plus Vol 4 of Arcadian $450 Bally Jefferson 3010 NArkendale St. Dabe City VA 22193 703-690-1837
- Wanted: used cassettes and programs/ games for the Arcade. Also have 15 Cybervision tapes to sell/trade, or want to purchase Cybervision unit. Bob Mitcham Box 11029 Clearwater, FL 33516
- Wanted: contact with other subscribers around the ages of 10-13. Contact Nick Brewer 5728 Marine Parkway, Mentor, OH 44060
- For Sale: Arcade with 13 videocades. Bally Basic and 4 controllers. System like new $375 complete. 408-262-3719 days-867-7256 nites (ask for Mrs. Fisher)
- Astrocade units, cartridges, etc., St Clair County area 794-4528 Discounts to "Arcadians" H. Gerow,Box 203 Algonac, MI 48001
- AT LAST a dealer for Astrocade in the Los Angeles area. HOME ARCADE ELECTRONICS 3742 Maxson Rd. El Monte, CA 91732 (213)443-4189 Please call/write for more information.

The SOURCEBOOK is a compilation of known SOURCES of Hardware and Software Products for the BALLY/ASTROCADE Professional ARCADE. It contains the only available complete index and descriptions to all ARCADIAN programs and tutorials, also a catalog section with advertisements from over twenty SOURCES of Program and Hardware Items.
The 98 page SOURCEBOOK is available for $7.00 in US Funds from:

RMH Enterprises
635 Los Alamos Ave.
Livermore, CA 94550

ARCADIAN
Robert Fabris, Good News
3626 Morrie Drive
San Jose, CA 95127-9990

the SOURCE TCD 959

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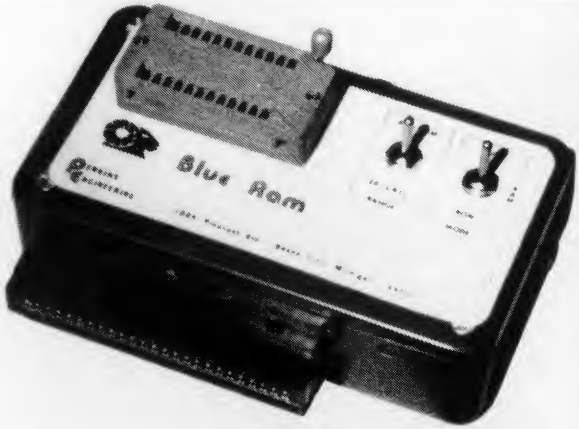
16384 BYTES OF RAM FOR YOUR ARCADE!



The Blue Ram by Perkins Engineering has already opened to door to hundreds of creative programmers who love the powerful graphics and sound capabilities in the Astrocade, but were stymied by its lack of random access memory (RAM). No more! Now, instantly, you can have 16384 bytes of additional memory.

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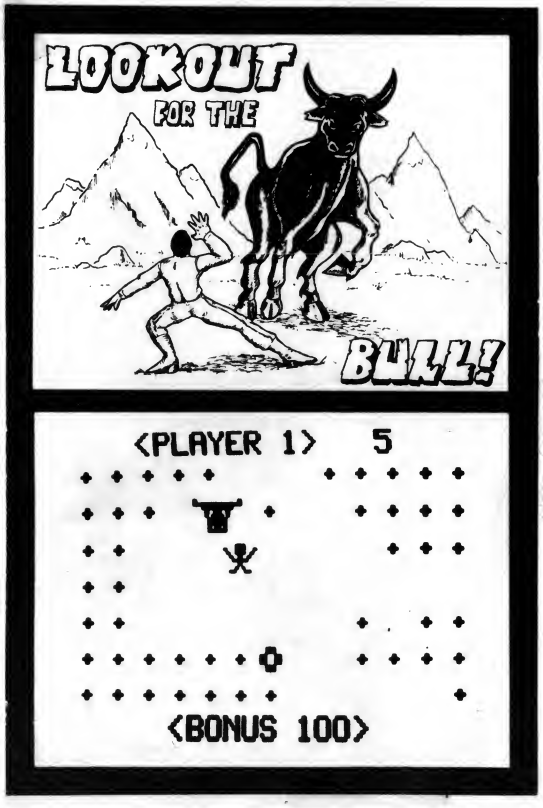

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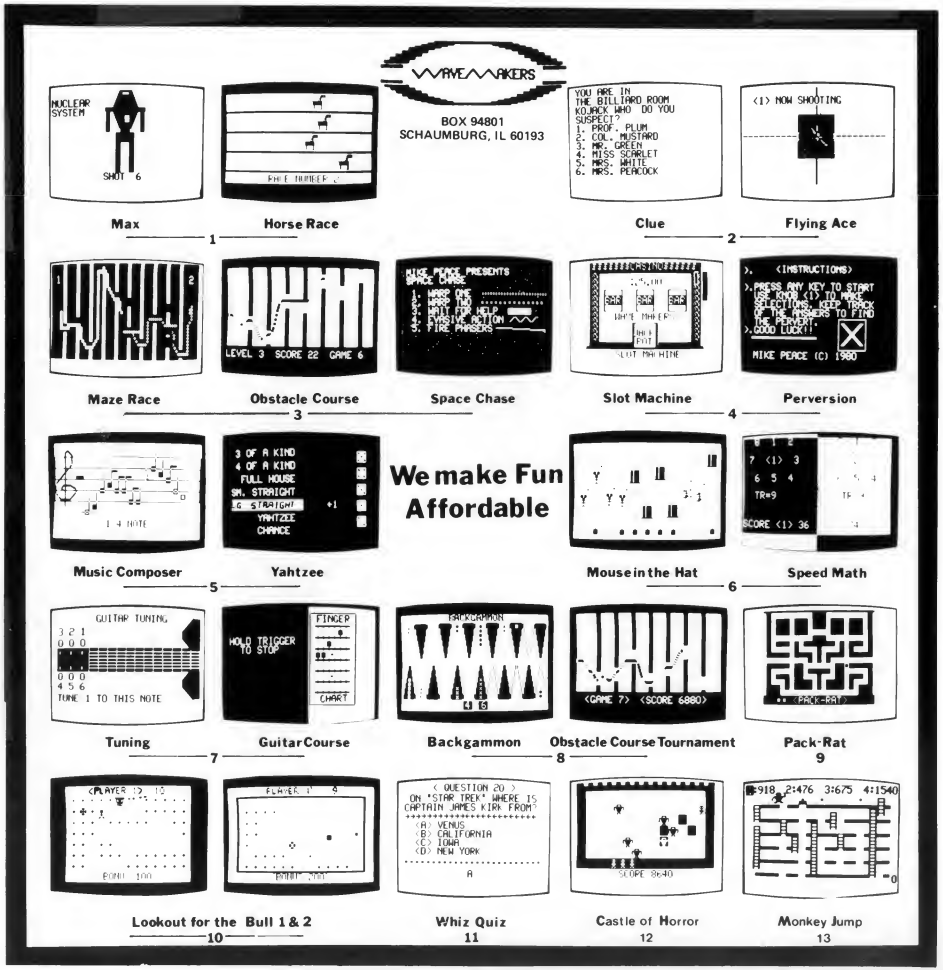

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